MONROE COUNTY COMMUNITY COLLEGE

Course Outcome Summary

Required Program Core Course

MECH 104 (CNC II)

Course Information

Division	**ASET**
Contact Hours	**60**
Total Credits	**3**

Prerequisites **MECH 103**

Course Description

This course emphasizes use of Computer Numerical Control (CNC) theory and practice as it applies to advanced machining techniques. Lab projects and online professional certification software will be used to determine form, fit, clearance, speeds and feeds, thread nomenclature, and other parameters as it applies to machining. Other topics covered are optimization of machining time, programming efficiency, cutter selection, tool life, quality and safety consideration in operation of CNC equipment. Use and editing of G & M code, as it applies to CNC milling centers and lathes, are practiced and demonstrated by students through appropriate lab assignments. Appropriate theory and practice of safe work methods will be emphasized. This course will cover half of the FANUC CNC Professional Certification.

This course is a required core course for students pursuing an AAS in Product and Process Technology.

Program Outcomes Addressed by this Course:

Upon successful completion of this course, students should be able to meet the program outcomes listed below:

A. Demonstrate safe operation and practices of equipment.
B. Specify proper Personal Protective Equipment (PPE) required for applicable work environments.
C. Interpret and explore the impact of new global and social applications in the manufacturing forum.
D. Identify the complete design and the process, from concept to completion.
E. Identify the major functions of a manufacturing system, their characteristics, and relationship to design, process routing and lean manufacturing.
F. Demonstrate computer competency required for CAM applications including CNC programming, set up, data transmission and the use of CAD/CAM editing software.
G. Analyze, apply and qualify engineering specifications for parts machined, prototyped or fabricated.
H. Analyze, design and add or remove material for physical systems in emerging fields, including medical applications, alloyed metals, composites and exotic materials.
I. Demonstrate competency in technical math, including trigonometry, required for process solutions.
J. Plan, design and implement the sequence of operations including tooling, machines, time studies, automation and robotic integrated manufacturing.
K. Communicate and problem solve in multi-disciplinary groups and teams to increase knowledge through lifelong learning disciplines.

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Course Outcomes

In order to evidence success in this course, the students will be able to:

1. Learning to Operate a Fanuc CNC using a FANUC Simulator.
   Program outcomes linked:
   C. Interpret and explore the impact of new global and social applications in the manufacturing forum.
   E. Identify the major functions of a manufacturing system, their characteristics, and relationship to design, process routing and lean manufacturing.
   K. Communicate and problem solve in multi-disciplinary groups and teams to increase knowledge through lifelong learning disciplines.

2. Know Your Machine from a Programmer's Viewpoint.
   Program outcomes linked:
   A. Demonstrate safe operation and practices of equipment.
   B. Specify proper Personal Protective Equipment (PPE) required for applicable work environments.
   C. Interpret and explore the impact of new global and social applications in the manufacturing forum.
   E. Identify the major functions of a manufacturing system, their characteristics, and relationship to design, process routing and lean manufacturing.

3. Prepare to Write Programs.
   Program outcomes linked:
   D. Identify the complete design and the process, from concept to completion.
   E. Identify the major functions of a manufacturing system, their characteristics, and relationship to design, process routing and lean manufacturing.
   F. Demonstrate computer competency required for CAM applications including CNC programming, set up, data transmission and the use of CAD/CAM editing software.
   G. Analyze, apply and qualify engineering specifications for parts machined, prototyped or fabricated.
   I. Demonstrate competency in technical math, including trigonometry, required for process solutions.
   J. Plan, design and implement the sequence of operations including tooling, machines, time studies, automation and robotic integrated manufacturing.
   K. Communicate and problem solve in multi-disciplinary groups and teams to increase knowledge through lifelong learning disciplines.

4. Understanding Motion types.
   Program outcomes linked:
   D. Identify the complete design and the process, from concept to completion.
   E. Identify the major functions of a manufacturing system, their characteristics, and relationship to design, process routing and lean manufacturing.
   F. Demonstrate computer competency required for CAM applications including CNC programming, set up, data transmission and the use of CAD/CAM editing software.
   G. Analyze, apply and qualify engineering specifications for parts machined, prototyped or fabricated.
   H. Analyze, design and add or remove material for physical systems in emerging fields, including medical applications, alloyed metals, composites and exotic materials.
   J. Plan, design and implement the sequence of operations including tooling, machines, time studies, automation and robotic integrated manufacturing.

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5. Setting Tool Length Compensation.
   Program outcomes linked:
   D. Identify the complete design and the process, from concept to completion.
   E. Identify the major functions of a manufacturing system, their characteristics, and relationship to design, process routing and lean manufacturing.
   F. Demonstrate computer competency required for CAM applications including CNC programming, set up, data transmission and the use of CAD/CAM editing software.
   G. Analyze, apply and qualify engineering specifications for parts machined, prototyped or fabricated.
   H. Analyze, design and add or remove material for physical systems in emerging fields, including medical applications, alloyed metals, composites and exotic materials.
   J. Plan, design and implement the sequence of operations including tooling, machines, time studies, automation and robotic integrated manufacturing.

6. Using Cutter Radius Compensation.
   Program outcomes linked:
   D. Identify the complete design and the process, from concept to completion.
   E. Identify the major functions of a manufacturing system, their characteristics, and relationship to design, process routing and lean manufacturing.
   F. Demonstrate computer competency required for CAM applications including CNC programming, set up, data transmission and the use of CAD/CAM editing software.
   G. Analyze, apply and qualify engineering specifications for parts machined, prototyped or fabricated.
   H. Analyze, design and add or remove material for physical systems in emerging fields, including medical applications, alloyed metals, composites and exotic materials.
   J. Plan, design and implement the sequence of operations including tooling, machines, time studies, automation and robotic integrated manufacturing.

7. Define the Workpiece Coordinate System.
   Program outcomes linked:
   D. Identify the complete design and the process, from concept to completion.
   E. Identify the major functions of a manufacturing system, their characteristics, and relationship to design, process routing and lean manufacturing.
   F. Demonstrate computer competency required for CAM applications including CNC programming, set up, data transmission and the use of CAD/CAM editing software.
   G. Analyze, apply and qualify engineering specifications for parts machined, prototyped or fabricated.
   H. Analyze, design and add or remove material for physical systems in emerging fields, including medical applications, alloyed metals, composites and exotic materials.
   J. Plan, design and implement the sequence of operations including tooling, machines, time studies, automation and robotic integrated manufacturing.

Date Updated: 3/13/2019
By: Troy Elliott