MONROE COUNTY COMMUNITY COLLEGE

Course Outcome Summary

Required Program Core Course

MECH 103 Machining Basics and CNC

Course Information

Division	**ASET**
Contact Hours	**90**
Theory	**30**
Lab Hours	**60**
Total Credits	**4**

Prerequisites **RDG 090 and qualifying score on accepted placement tests**

Course Description

This course introduces the student to operation of basic machine tools, care and use of hand tools and common measuring equipment used in the machine shop. Theory and hands on operation of manual mill, lathe, surface grinder, band saws and basic operation of Computer Numerical Controlled (CNC) machines are emphasized in this course. Other topics covered include basic metallurgy of metal cutting and machine tool theory. Appropriate terminology is used and theory and practice of safe work methods will be emphasized.

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

1. Demonstrate and practice shop safety.
   Program outcomes linked:
   - A. Demonstrate safe operation and practices of equipment.
   - B. Specify proper Personal Protective Equipment (PPE) required for applicable work environments.

2. Describe mill, lathe, surface grinder and shop tooling with proper terminology.
   Program outcomes linked:
   - A. Demonstrate safe operation and practices of equipment.
   - 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. Identify common machine tools and their nomenclature.
   Program outcomes linked:
   - A. Demonstrate safe operation and practices of equipment.
   - 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.

4. Demonstrate knowledge using direct precision measuring devices to accurately measure parts.
   Program outcomes linked:
   - A. Demonstrate safe operation and practices of equipment.
   - 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.
   - 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.
   - K. Communicate and problem solve in multi-disciplinary groups and teams to increase knowledge through lifelong learning disciplines.

5. Identify all parts of a detail drawing and print requirements.
   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.
   - H. Analyze, design and add or remove material for physical systems in emerging fields, including medical applications, alloyed metals, composites and exotic materials.

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6. Identify basic G & M code programming.
   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.
   - 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.

7. Identify set up procedures and tooling for CNC machining.
   Program outcomes linked:
   - A. Demonstrate safe operation and practices of equipment.
   - D. Identify the complete design and the process, from concept to completion.
   - F. Demonstrate computer competency required for CAM applications including CNC programming, set up, data transmission and the use of CAD/CAM editing software.
   - 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.

8. Demonstrate proper manual and CNC operation of CNC, Mill, Lathe and surface grinder.
   Program outcomes linked:
   - A. Demonstrate safe operation and practices of equipment.
   - B. Specify proper Personal Protective Equipment (PPE) required for applicable work environments.
   - 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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By: Troy Elliott