

# Raritan Valley Community College

## Course Outline

### **EMET 152 – Conventional Machining Operations II**

#### **I. Basic Course Information**

- A. Course Number and Title: EMET152 – Conventional Machining Operations II
- B. New or Modified Course: New
- C. Date of Proposal: Fall 2018
- D. Effective Term: Spring 2019**
- E. Sponsoring Departments: Science and Engineering Department
- F. Semester Credit Hours: 3
- G. Weekly Contact Hours: 6                              Lecture: 3  
   Laboratory: 3  
   Out of Class Student Work per Week: 7.5
- H. Prerequisite: EMET151 – Conventional Machining Operations I
- I. Laboratory Fees: Yes
- J. Name and Telephone Number or E-Mail Address of Department Chair and Divisional Dean at time of approval: Marianne Baricevic (Chair), Marianne.baricevic@raritanval.edu; Sarah Imbriglio (Dean), sarah.imbriglio@raritanval.edu

#### **II. Catalog Description**

Prerequisite: EMET151 – Conventional Machining Operations I

The Conventional Machining Operations II course is the second of four courses designed to prepare students to develop the requisite skills to become a Certified Level 1 Machinist in accordance with the National Institute for Metalworking Skills training and performance criteria (NIMS – Machining Level 1) and serves as a Technical Elective for the RVCC Mechanical Engineering Technology program. The course training includes the fundamentals of calibration, geometric dimensioning and tolerancing, theory, set-up, and operation of the Engine Lathe and Manual Milling machines. Classes are conducted in a fully functional machine shop environment located on the RVCC Campus equipped with manual and CNC mills and lathes, virtual machining centers, precision measurement equipment, and all basic machine shop tools. Through

this course students earn four NIMS Metalworking Skills Certifications.

Certificate 3: Milling I

Certificate 4: Turning Operations: Turning Between Centers

Certificate 5: Turning Operations: Turning Chucking Skills

Certificate 6: NIMS Machining Level I: Grinding Skills

### **III. Statement of Course Need**

The Conventional Machining Operations II course is taken as prerequisite with the other Advanced Manufacturing Courses and serves as a Technical Elective for the RVCC Mechanical Engineering Technology (MET) program. It provides the basic skills necessary to prepare students for entry into the following sequence of courses:

- EMET 253 - CNC Milling Programming and Operations
- EMET 254 - CNC Turning Program and Operations

### **IV. Place of Course in College Curriculum**

- A. This course is a Free Elective
- B. This course is a Mechanical Engineering Technology Elective
- C. This course meets an elective program requirement for A.S. Mechanical Engineering Technology.
- D. Course transferability; for New Jersey schools go to the NJ Transfer website, [www.njtransfer.org](http://www.njtransfer.org). For all other colleges and universities go to their individual sites.

### **V. Outline of Course Content**

- A. Grinding Skills
  - a. Basic Grinding Theory, Operation, Processes
  - b. Grinding Wheel Materials, Geometry and Variables
- B. Manual Milling Skills I
  - a. Manual Mill Basics
  - b. Mill Setup and Operation
  - c. Holemaking on the Manual Mill
  - d. Speed and Feed for the Mill
  - e. Mill Tool Geometry

- C. Job Planning, Benchwork & Layout
  - a. Benchwork and Layout Operations
  - b. Basic Metal Cutting Theory, Safety for Metal Cutting
  - c. Supporting and Locating Principles and Devices
  - d. Basics of Tolerance
  - e. Surface Texture and Inspection
  - f. Introduction to GD&T
  
- D. Turning Operations
  - a. Inspecting a Cylindrical Part
  - b. Engine Lathe Setup, Operations
  - c. Threading on the Engine Lathe
  - d. Taper Turning on the Engine Lathe
  - e. Toolholders for Turning
  - f. Chucks, Collets, and Vises

## **VI. General Education and Course Learning Outcomes:**

### **A. General Education Learning Outcomes:**

At the completion of the course, students will be able to:

1. Perform calculations required for the design and machining of a mechanical part (GE-NJ 2)
2. Apply knowledge of machining and materials to machine and solve problems when machining mechanical parts (GE-NJ 2, GE-NJ 3) \*

\*embedded critical thinking

### **B. Course Learning Outcomes (CLO)**

At the completion of the course, students will be able to:

1. Select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly defined engineering technology activities.\*
2. Select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies.\*
3. Conduct grinding operations.
4. Calibrate measuring instruments and provide an overview on part tolerance – including different types of tolerances and the relationship between tolerances and part dimensions.
5. Read blueprints.
6. Conduct bench-work and layout processes needed during manual machining.
7. Set-up, and operate the Engine Lathe and Manual Mill and demonstrate competency by completing defined physical models.

8. Use workholding devices during the manufacturing process and identify common groups of these devices.
9. Define threads required for an application and how to make them using a manual lathe – external (OD) and internal (ID) classified according to either Unified or ISO metric standards.
10. Practice safety actions including LOTO (lock out/tag out), SDS and Hazard communication, Flammable/Combustible Liquids.
11. Use common types of clamping components and explain their relative advantages and applications.
12. Understand common types of clamping components and explain their relative advantages and applications.
13. Must pass all NIMS certifications to receive college credit.

\* This Course Learning Outcome supports the achievement of TAC of ABET Criterion 9 requirements.

## **VII. Modes of Teaching and Learning**

- A. Lectures and online interactive textbooks
- B. Demonstrations
- C. Laboratory work
- D. Instructional videos/DVDs
- E. Site visits

## **VIII. Papers, Examinations, and other Assessment Instruments**

- A. laboratory performance
- B. examinations

## **IX. Grade Determinants**

- A. lab performance
- B. examinations
- C. class participation

## **X. Text and Materials**

Suggested Text: Tool-U

## **XI. Resources**

- A. reference books
- B. safety equipment

C. instructional videos/DVDs