Raritan Valley Community College
Course Outline

EMET 151 – Conventional Machining Operations I

I. Basic Course Information

A. Course Number and Title: EMET 151 – Conventional Machining Operations I

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: None

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

The Conventional Machining Operations I course is the first 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 blue print reading, fundamentals of calibration, geometric dimensioning and tolerancing, materials, machine shop safety, job planning, benchwork & layout, and grinding skills, and drill press skills. 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 can four NIMS Metalworking Skills Certifications and the OSHA-10 Safety certification. The student can earn the following National Institute for Certificate 1: (NIMS) Machining Level I: Measurement, Materials and Safety and

Certificate 2: Job Planning, Benchwork & Layout
Certificate 7: NIMS Machining Level I: Drill Press Skills

III. Statement of Course Need

The Conventional Machining Operations I Course is taken as a 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 152 - Conventional Machining Operations II
- EMET 253 - CNC Milling Programming and Operations
- EMET 254 - CNC Turning Program and Operations

IV. Place of Course in College Curriculum

A. Mechanical Engineering Technology (MET) Elective

B. This course meets an elective program requirement for A.S. Mechanical Engineering Technology.

C. B. Course transferability; for New Jersey schools go to the NJ Transfer website, www.njtransfer.org. For all other colleges and universities go to their individual sites.

V. Outline of Course Content

A. Safety
    a. OSHA intro
    b. PPE – Personal Protection Equipment
    c. Fire Safety
    d. Hazardous Materials
    e. Workplace Safety
B. Measurement & Materials
    a. Measurement Systems & Conversions
    b. Shop Math Skills
        i. Fractions, Decimal, Percent
        ii. Geometry: Circles (Diameter, Radius, Circumference)
        iii. Angles: Right Triangles & Trigonometry
    c. Semi-Precision & Precision Instruments
    d. Calibration
    e. Classifications of Metals

C. Introduction to Machining
    a. Basic Metal Cutting Theory
    b. Metal Cutting Fluids, Cutting Fluid Safety
    c. Basic Skills for:
        i. Bandsaw
        ii. Bench Grinding
        iii. Drill Press
        iv. Manual Milling Machine
        v. Engine Lathe
D. Drill Press
    a. Workholding & Toolholding
    b. Tool Geometry
    c. Operations
    d. Project Based Skills
E. Workplace Skills
    a. Machine Shop Best Practices, including 5S and ISO methodologies
    b. Lean Manufacturing Skills
    c. Into to Resume Writing and Interviewing Skills

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)

B. Course Learning Outcomes (CLO):

At the completion of the course, the 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. Read and interpret blueprints
4. Conduct measurements, inspection, and tolerancing of linear dimensions, holes, and threads with respect to blueprint requirements and a datum.
5. Apply the basics of metal cutting, lubrication, and grinding to perform machining operations.

6. Set-up, and operate the drill press and grinder and demonstrate competency by completing defined physical models.
7. Demonstrate knowledge of all Machine Shop Safety procedures.
8. Identify major drill components and angles that impact drilling operations and how to identify various speed and feed values.
9. 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

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