RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

EMET 215 – Engineering Materials and Processing

I. Basic Course Information

A. Course Number and Title: EMET 215 – Engineering Materials and Processing

B. New or Modified Course: New Course

C. Date of Proposal: Fall 2018

D. Effective Term: Spring 2021

E. Sponsoring Department: Science and Engineering

F. Semester Credit Hours: 3

G. Weekly Contact Hours: 4 Lecture: 2
Laboratory: 2
Out of class student work per week: 6 hours

H. Prerequisites: None

I. Laboratory Fees: None

J. Name and Telephone Number or E-Mail Address of Department Chair and Dean at time of approval: Chair: Dr. Marianne Baricevic, marianne.baricevic@raritanval.edu, Dean: Dr. Sarah Imbriglio, Sarah.Imbriglio@raritanval.edu

II. Catalog Description

EMET 215 Engineering Materials and Processing is a combined lecture and laboratory relating to the study of engineering materials. Topics addressed include, basic atomic structure and crystalline solids, processes of formation from liquid and particle state, plastic forming, molding deformation and metal removal, and the effect of heat treatment on metal properties. Students will perform Laboratory exercises involve basic machine tools and computer controlled equipment.

III. Statement of Course Need

A. It is a required course for the MET program.
B. This course generally transfers as a requirement of engineering programs.

IV. Place of Course in College Curriculum

A. This course is a Free Elective.
B. This course meets a program requirement for the Mechanical Engineering Technology (MET) AS degree.
C. To see course transferability: a) for New Jersey schools, go to the NJ Transfer website, www.njtransfer.org; b) for all other colleges and universities, go to the individual websites.

V. Outline of Course Content

A. Introduction: Basic Atomic Structure & Crystalline Solids; The Solid State; Forming of Engineering Materials from the Elements
B. Fundamentals of Metal Alloys; Equilibrium Diagrams.
C. Testing of Engineering Materials.
D. Heat Treatment of Metals.
E. Classification of Steels. Material Selection for Designed Product.
F. Manufacturing Processes. Material Deformation Processes.
G. Casting, Welding, Powder Metallurgy and Their Influence on the Design Aspects of Machine Components.
H. Measurement, Inspection, System of Fits, Computer Controlled Inspected Stations.
I. Theory of Cutting.
J. Machining Processes: Conventional and Computer Controlled.

VI. General Education and Course Learning Outcomes

A. General Education Learning Outcomes:

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

1. Select materials for engineering applications. (GE-NJ 2)
2. Compose hypotheses and apply problem solving strategies. (GE-NJ 2, GE-NJ 3*)

*Embedded critical thinking

B. Course Learning Outcomes:

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

1. 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 (*).
2. Conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes (*).
3. Select an alloy for a required application.
4. Select a desired material for part design.
5. Demonstrate an ability to define the mechanical properties of different steels and cast iron.
6. Select appropriate manufacturing process & bring selected material to manufacturing.

7. Define tolerances, allowance and difference between clearance & allowance.
8. Demonstrate ability to use different measuring tools and take readings from them with required accuracy.

(*) The Course Learning Outcomes support the achievement the TAC of ABET Criterion 9 requirements.

C. Assessment Instruments

1. Quizzes
2. Exams
3. Homework
4. Lab Reports
5. Projects

VII. Grade Determinants

A. Quizzes
B. Chapter Exams
C. Homework
C. Lab Reports
D. Final Cumulative Exam
E. Projects

Primary formats, modes, and methods for teaching and learning that may be used in the course:

A. lecture/discussion
B. small-group work
C. student collaboration
D. independent study

VIII. Texts and Materials

The following types of course materials will be used.

Text: 1. E. Paul De Garmo, J.T. Black, R.A. Kohler. Materials and Processes in Manufacturing, 8th Edition, MacMillian, NY, 1997.

Computer Use:

- Microsoft Office

Please Note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.

IX. Resources

No other type of resources are needed

X. Honors Option

Not applicable