RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

EMET 237 – Strength of Materials for Technology

I. Basic Course Information

A. Course Number and Title: EMET 237 – Strength of Materials for Technology

B. New or Modified Course: New Course

C. Date of Proposal: Fall 2018

D. Effective Term: Fall 2019

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: 5 hours

H. Prerequisites: EMET235 (Statics for Technology)

I. Laboratory Fees: Yes

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

Prerequisites: EMET235 (Statics for Technology)

Provides an understanding of the kinds of stress and deformation and how to determine them in a wide range of simple, practical structured problems, and an understanding of the mechanical behavior of materials under various load conditions. The laboratory experience is integrated within the course. Upon successful completion of this course, the students should be able to determine stresses and deformations for a variety of simple structural problems.

III. Statement of Course Need

    A. It is a required course for the Mechanical Engineering Technology (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. Stresses,
    B. Strains,
    C. Displacement,
    D. Deformation,
    E. Statically Indeterminate Problems,
    F. Strain Energy,
    G. Temperature Change,
    H. Torsion,
    I. Flexural Stresses,
    J. Shear and Moment Diagrams,
    K. Shear Stresses,
    L. Plane Stress and Strain Transformations,
    M. Mohr's Circle, Strain Rosette, Failure Criteria,
    N. Hooke's Law,
    O. Deflection of Beams,
    P. Superposition,
    Q. Columns,
    R. Pressure Vessels and Combined Loading

VI. General Education and Course Learning Outcomes

    A. <u>**General Education Learning Outcomes:**</u>

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

    1. Analyze text, interpret problem data, and prepare laboratory reports. (GE-NJ 2, GE-NJ 3) #
    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. Function effectively as a member or leader on a technical team (*).
4. Calculate stresses and deformations for a variety of structural problems.
5. Develop shear and bending moment diagrams for a variety beams.
6. Develop Mohr's Circle for a various states of plain stress or strain.
7. Calculate the deflection of beams for simple loadings.
8. Calculate the Euler buckling load for simple columns.
9. Calculate the stresses in pressure vessels.

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

C. Assessment Instruments

The following assessment methods may be used:

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

VII. Grade Determinants

Factors that may enter into the determination of the final grade
A. Quizzes
B. Chapter Exams
C. Homework
D. Lab reports
E. Final Cumulative Exam
F. 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: Beer, Johnston, DeWolf, and Mazurek Mechanics of Materials, Seventh Edition, McGraw-Hill, ISBN: 978-0-07-339823-5

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