

III. Statement of Course Need

- A. It is a standard course of an engineering program, and it is needed to ensure the credibility and transfer articulations of our engineering program.
- B. This course has no lab component.
- C. 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 Engineering Science 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. Stress at a point; tensile, compressive, and shear stresses
- B. Stress in statically indeterminate bars, thermal stresses
- C. Stresses on inclined planes, strain energy
- D. Torsion of circular shafts, E and G relation, power transmission
- E. Statically indeterminate torsion, strain energy in torsion
- F. Shear forces and bending moments in beams
- G. Bending stress and strain in beams, shear stress in beams
- H. Design of beams, Composite beams
- I. Stress transformation, principal stresses, maximum shear stress
- J. Mohr's circle, generalized Hooke's law
- K. Spherical and cylindrical pressure vessels
- L. Combined stresses in beams, Failure theories
- M. Deflection of beams, Castigliano's theorem
- N. Statically indeterminate beams, method of superposition
- O. Buckling of columns

VI. General Education and Course Learning Outcomes

A. General Education Learning Outcomes:

1. Analyze text and interpret problem data. (GE-NJ 2*)
 2. Compose hypotheses and apply problem solving strategies. (GE-NJ 2)
- * Embedded critical thinking

B. Course Learning Outcomes:

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

1. Apply the concepts of the stress at a point, strain, stress-strain relations, stress transformation, and failure theories to create engineering designs.
2. Calculate the stress, strain, and deformation in bars, thin-walled pressure vessels, shafts, beams, buckling of columns, statically indeterminate beams.

C. Assessment Instruments

The following assessment methods may be used:

1. Quizzes
2. Exams
3. Homework

VII. Grade Determinants

Factors that may enter into the determination of the final grade

- A. Quizzes
- B. Chapter Exams
- C. Homework
- D. Final Cumulative Exam

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.

Suggested textbooks:

- “Mechanics of Materials”, R.C. Hibbler

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