**I.** **COURSE** **TITLE**: Strength of Materials

**COURSE** **NUMBER**: 2203  **CATALOG** **PREFIX**: ENDS

**II.** **PREREQUISITES**: ENDS 2201

**III.** **CREDIT** **HOURS**: 3 **LECTURE** **HOURS**: 2

**LABORATORY** **HOURS**: 1 (2 contact) **OBSERVATION** **HOURS**: 0

**TOTAL CONTACT HOURS**: 4

**IV.** **COURSE** **DESCRIPTION**:

An introductory course in mechanics of materials, analysis and design of members subjected to various combinations of loading, stress and strain, beams, columns, members in torsion. In-class experiments investigate the response of deformable bodies to applied loads.

**V.** **ADOPTED** **TEXT(S)**:

Applied Strength of Materials

4th edition

Jensen/Chenoweth.

McGraw-Hill

ISBN: 0-07-032490-5

**VI.** **COURSE** **OBJECTIVES**:

At the completion of this course the student will:

1. Gain the basic knowledge required for the successful design of machine parts and of structural members, parts and connections.

2. Develop an understanding of the relation existing between the externally applied forces and the internally induced stresses.

3. Understand the relationship between externally applied loads and the resulting deformations such as elongation and twist.

**VII.** **COURSE METHODLOGY:**

Course is a combination of in-class lecture and hands-on experiments.

**VIII.** **GRADING**:

Grading follows the policy in the college catalog:

90 – 100 = A

80 – 89 = B

70 – 79 = C

60 – 69 = D

0 – 59 = F

**IX**. **COURSE** **OUTLINE**:

WEEK TOPIC MATERIAL:

1 Stress Introduction. Define stress. Basic stresses

Ultimate stress. Allowable stress, Factor of

Safety.

2 Axial The Direct-Stress Formula. Structural

Deformation Members. Axial Strain. Elasticity, Poisson’s

Ratio.

3 Stress-Strain Stress-Strain Diagram

Stress Concentration. Test One.

4 Engineering Engineering Materials and their properties

Materials Definitions of properties of materials

Methods of manufacture

5 Torsion

Torsion in Twisting moments & Torque

Shafts Stresses in circular shafts. Torsion Formula

6 Couplings Analysis and design of circular shafts

7 Power Shaft couplings. Angle of twist. Power,

Test Two

8 Centroids Centroids and Moments of Inertia.

9 Moments Moments of Inertia of simple & composite areas.

10 Shear and Shear and Moment in beams. Types of beams.

Moment Loads on beams. Beam support reactions

11 Critical Shear and moment in beams. Critical sections

Sections Maximum Moment.

12 Shear Diagrams Shear and Moment Diagrams

Test Three

13 Stresses in Stresses in beams. Tensile & Compressive Stress

Beams The Flexure Formula. Section Modulous. Shear-

Ing stresses in beams. The General Shear Formula

Load capacity of given beams

14 Design of Considerations in beam design. Timber beams.

Beams Steel beams. Overhanging and cantilever beams

15 Deflection Deflection of beams. Relationship between curvature

Of Beams and stress. The Beam-Diagram Method. The Moment-Area

Method. Cantilever beams, simple, and overhanging

Beams. Concentrated and distributed loads.

Summary of deflection formulas.

**X**. **OTHER** **REQUIRED** **BOOKS, SOFTWARE** **AND** **MATERIALS**:

Student will furnish drafting instruments, paper, and three-ring binder for assigned exercises and labs, requiring both mathematical and graphical solutions.

**XI.** **EVALUATION**:

Assignments and Attendance = 20% of final grade

Three tests = 60% of final grade

Comprehensive Final Examination = 20% of final grade

Also see section XII.

**XII.** **SPECIFIC** **MANAGEMENT** **REQUIREMENTS**:

All assignments and tests must be turned in on time. Students may work on their own time to complete the assignments. Laboratory exercises are assigned for the student to complete during class lab hours.

Examinations will include written and graphical components.

**XIII.** **OTHER INFORMATION:**

**FERPA:** Students need to understand that your work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes.

Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**DISABILITIES:** Students with disabilities may contact the Disabilities Service Office, Central Campus, at 800-628-7722 or 937-393-3431