STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

COURSE OUTLINE

CONS 272 STRENGTH OF MATERIALS FOR TECHNICIANS

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CIVIL AND CONSTRUCTION TECHNOLOGIESDEPARTMENT
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CONS 272 STRENGTH OF MATERIALS FOR TECHNICIANS

A. ! TITLE: STRENGTH OF MATERIALS FOR TECHNICIANS

B. ! COURSE NUMBER: CONS 272

C. ! CREDIT HOURS: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

 # Credit Hours: 3
 # Lecture Hours: (2) one hour lectures **per week**
 # Lab Hours: per week
Other: (1) two-hour recitation **per week**

Course Length: 15 **Weeks**

D. ! WRITING INTENSIVE COURSE: NO

E. ! COURSE LENGTH: 15 WEEKS

F. ! SEMESTER(S) OFFERED: Fall, Spring

G. ! HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:

2 – one hour lectures and 1 – two hour recitation per week

H. CATALOG DESCRIPTION:

The concepts of stress and strain are introduced and, in combination with statics principles, are used in the analysis of structural elements. Material properties such as ultimate strength, yield strength, elastic modulus, shear strength, torsional strength, and compressive strength are investigated using physical testing. The process of selecting structural elements such as pins, bolts, tension members, compression members, beams and shafts based on strength and factor of safety is presented and practiced.

I. ! PRE-REQUISITES: A grade of C or better in CONS172 (Technical Statics) or ENGS201 (Statics), MATH161 (Calculus 1)

J. ! GOALS (STUDENT LEARNING OUTCOMES):
By the end of this course, the student will be able to:

Course Objective	*Institutional SLO*
a) Interpret the results from a tensile test.	3. Professional Competence 2. Critical Thinking
b) Solve for the stress, strain, and deformation in axially loaded tension or compression members .	3. Professional Competence

c) Determine the shear stresses present in bolted connections under load.	3. Professional Competence
d) Determine bearing stresses present in building foundation elements or mechanical connections.	3. Professional Competence
e) Design or select structural elements such as tension member or pins based on area required	3. Professional Competence 2. Critical Thinking
f) Create shear and moment diagrams from loading diagrams of beams.	3. Professional Competence
g) Determine the bending stress, shear stress and deflection expected in structural beams.	3. Professional Competence
h) Compute the critical stress and allowable load for axially loaded compression members (columns)	3. Professional Competence 2. Critical Thinking
i) Calculate the shear stress in a shaft subjected to torsion.	3. Professional Competence

K. TEXTS: (Suggested)

Statics and Strength of Materials by Cheng, *Glencoe Publishing* ,
Statics and Strength of Materials by Onouye, *Pearson*
Applied Statics and Strength of Materials by Limbrunner and Spiegel*, Pearson Publishing*

L. REFERENCES:

M. EQUIPMENT: No special equipment is required of the student.

N. GRADING METHOD: A - F

O. MEASUREMENT CRITERIA/METHODS:

- Quizzes
- Home problems/assignments
- Exams
- **Final Exam**

P. DETAILED COURSE OUTLINE:

I. Review of statics
  - *a.* Equilibrium formulas
  - *b.* Solving reactions

II. Stress
  - *a.* Tension
  - *b.* Compression
  - *c.* Shear
  - *d.* Bearing

III. Strain
  - *a.* Defined

b. Deformation of axially loaded members
c. Thermal stresses

IV. Mechanical properties
a. The tensile test (of steel and aluminum)
b. Elastic modulus
c. Yield strength
d. Ultimate strength
e. Factor of safety in design
f. Compression test (of concrete)

V. Torsion in shafts
a. The torsion formula
b. Angle of twist
c. Power transmission
d. The torsion test

VI. Shear and bending in beams
a. Types of beams
b. Review of beam reactions
c. Shear force
d. Bending moment
e. Shear and moment diagrams

VII. Stresses in beams
a. The flexure formula
b. Indirect tensile and compressive stresses
c. General horizontal shear stress formula
d. Special indirect shear for rectangular and circular sections
e. Approximate shear in steel beams

VIII. Deflection of beams
a. When loaded uniformly
b. When subjected to symmetric, concentrated loads
c. Superposition of deflection

Q. LABORATORY OUTLINE:

NA – The 2 hour session will not be operated as a traditional lab. Rather the additional time will allow the instructor to (1) engage the student in lengthy problem solutions and (2) engage the students in a hands-on apparatus that demonstrates principles associated with current lecture topics