

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



**MASTER SYLLABUS**

**COURSE NUMBER – COURSE NAME  
CONS 275 – Strength of Materials Lab**

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**Canino School of Engineering Technology**

**Department: Civil and Construction Technologies**

**Semester/Year: Spring/2021**

A. **TITLE:** Strength of Materials Lab

B. **COURSE NUMBER:** CONS 275

C. **CREDIT HOURS:** 1 credit hour(s) per week for 15 weeks

- One hour (50 minutes) of lecture per week  
 Two to three hours of lab or clinical per week Two Hours  
 Two hours of recitation per week  
 40 hours of internship

D. **WRITING INTENSIVE COURSE:** Yes  No

E. **GER CATEGORY:** None:  Yes: GER  
*If course satisfies more than one: GER*

F. **SEMESTER(S) OFFERED:** Fall  Spring  Fall & Spring

G. **COURSE DESCRIPTION:**

This course supplements the material presented in strength of materials, by providing laboratory tests, hands-on projects and practical applications. The course also introduces new and basic topics related to structural analysis. Engineering materials to be worked with include steel, aluminum, concrete, timber, and composite materials. Topics will include: tension test, compression test, bending test, deflection test, elastic plate test under uniformly distributed area load, dead load, live load, and snow load calculations.

H. **PRE-REQUISITES:** None  Yes  If yes, list below:

CONS 272 Strength of Materials OR ENGS 203 Engineering Strength of Materials

**CO-REQUISITES:** None  Yes  If yes, list below:

May be taken coincident with CONS 272 or ENGS 203

**I. STUDENT LEARNING OUTCOMES: (see key below)**

By the end of this course, the student will be able to:

<u>Course Student Learning Outcome</u> [SLO]	<u>Program Student Learning Outcome</u> [PSLO]	<u>GER</u> [If Applicable]	<u>ISLO &amp; SUBSETS</u>	
Conduct and analyze data from a tensile test including determination of the ultimate strength, yield strength and modulus of elasticity for steel specimen	3a, 3b		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
Conduct and analyze data from a tensile test including determination of the ultimate strength, yield strength and modulus of elasticity (if any) for aluminum and composite material specimens, and compare different mechanical properties among different materials	3a, 3b		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
Conduct and analyze data from a compression (column strength) test by creating the bi-modal column strength curve for a section	3a, 3b		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
Predict and examine experimentally the impact of moment of inertia, modulus of elasticity and orientation on the bending resistance of a flexural member	3a, 3b		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
Conduct and analyze the deflection test of a beam and compare to expected deflection from standard formulas	3a, 3b		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets

Calculate Dead Loads for typical steel, concrete and timber structures per ASCE 7-10	2c		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
Determine Live Loads for typical structures per ASCE 7-10	2c		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
Calculate Snow Loads per ASCE 7-10	2c		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
Analyze loadings for One-Way and Two-Way Slabs under dead and live loads	2c		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
			ISLO ISLO ISLO	Subsets Subsets Subsets Subsets

<b>KEY</b>	<b><u>Institutional Student Learning Outcomes [ISLO 1 – 5]</u></b>
<b>ISLO #</b>	<b>ISLO &amp; Subsets</b>
<b>1</b>	<b>Communication Skills</b> Oral [O], Written [W]
<b>2</b>	<b>Critical Thinking</b> <i>Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</i>
<b>3</b>	<b>Foundational Skills</b> <i>Information Management [IM], Quantitative Lit./Reasoning [QTR]</i>
<b>4</b>	<b>Social Responsibility</b> <i>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</i>
<b>5</b>	<b>Industry, Professional, Discipline Specific Knowledge and Skills</b>

\*Include program objectives if applicable. Please consult with Program Coordinator

J. **APPLIED LEARNING COMPONENT:** Yes  No

If YES, select one or more of the following categories:

- Classroom/Lab
- Internship
- Clinical Placement
- Practicum
- Service Learning
- Community Service

- Civic Engagement
- Creative Works/Senior Project
- Research
- Entrepreneurship  
(program, class, project)

**K. TEXTS:**

none required

**L. REFERENCES:**

The texts used in CONS272 and CONS 336 will serve as a reference (e.g. 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; R. C. Hibbeler, Structural Analysis, 9th Edition, Pearson – Prentice Hall, 2015.)  
ASCE 7-10 (or current edition) Minimum Design Loads for Buildings and Other Structures

**M. EQUIPMENT: None  **Needed:** Materials Testing Lab (NS-110) - instron (300K loading), torsion test machine, beam bender, compression strength testing machine, polishing machine, hardness testing, heat treating furnace, jamany**

**N. GRADING METHOD:**

**O. SUGGESTED MEASUREMENT CRITERIA/METHODS:**

**Lab Write-ups and Reports, Synthesis of Material Properties Assignment, Exams**

**P. DETAILED COURSE OUTLINE:**

**Q. LABORATORY OUTLINE: None  Yes**

- 1. Material Properties**
- 2. Tensile Test of Steel**
- 3. Tensile Test of Aluminum**
- 4. Tensile Test of Composite Materials**
- 5. Synthesis of Tensile Properties for Different Materials**
- 6. Compressive Test of Concrete**
- 7. Compressive Strength Test**
- 8. Flexural test of timber**
- 9. Deflection of a Beam**
- 10. Structural Design Philosophy and ASCE 7-10 Loads and Load Combinations**
- 11. Dead and Live Loads**
- 12. Snow Load**
- 13. Test of Elastic Plate under Uniformly Distributed Area Load**
- 14. One-Way and Two-Way Slabs**
- 15. Load Path of Buildings and Bridges (Optional)**