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

MASTER SYLLABUS

CIVL 303 – STRUCTURAL ANALYSIS

CIP Code: 14.0803

Created by: Saeid Haji Ghasemali
Updated by:

School: Canino School of Engineering Technology
Department: Civil and Construction Technology
Implementation Semester/Year: Fall 2026

A. TITLE: Structural Analysis

B. COURSE NUMBER: CIVL 303

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

# Credit Hours per Week	**4**
# Lecture Hours per Week	**3**
# Recitation Hours per week	
# Lab Hours per Week	**2**
Other per Week	

D. WRITING INTENSIVE COURSE:

Yes	
No	x

E. GER CATEGORY:

Does course satisfy a GER category(ies)? If so, please select all that apply.

[1-2] Communication	
[3] Diversity: Equity, Inclusion & Social Justice	
[4] Mathematics & Quantitative Reasoning	
[5] Natural Science & Scientific Reasoning	
[6] Humanities	
[7] Social Sciences	
[8] Arts	
[9] US History & Civic Engagement	
[10] World History & Global Awareness	
[11] World Languages	

F. SEMESTER(S) OFFERED:

Fall	x
Spring	
Fall and Spring	

G. COURSE DESCRIPTION:

This course introduces the basic analysis and computer methods that are required to analyze basic structural elements and simple structures.
Key topics include design loads, analysis of statically determinate beams, frames, and trusses, as well as shear and moment diagrams and influence diagrams. Students will also learn about beam deflections, statically indeterminate structures (including beams and frames), displacement methods, and gain an introduction to energy methods.

H. PRE-REQUISITES:

ENGS 203 (Engineering Strength of Materials); and MATH 162 (Calculus II), or permission from the instructor.

CO-REQUISITES:

I. STUDENT LEARNING OUTCOMES:

Course Student Learning Outcome [SLO]	Program Student Learning Outcome [PSLO]	GER	ISLO & Subsets
a. Determine the dead and live loads to be considered for structural analysis. Calculate the wind and/or earthquake loads to be considered for structural analysis.	SO 2, SO1		ISLO 5
b. Determine whether a structure is statically determinate or indeterminate.	SO 2, SO1		ISLO 5
c. Determine shear and moment functions and diagrams for beams and frames.	SO 2, SO1		ISLO 5
d. Determine the effect of moving loads on structures using influence lines.	SO 2, SO1		ISLO 5
e. Determine the forces and deflections of structural members and frameworks using various analytical techniques.	SO 2, SO1		ISLO 5
f. Construct structural model in structural analysis software. Design load cases and load combinations. Perform structural analysis and interpret the results for member design.	SO 2, SO1		ISLO 5

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

J. APPLIED LEARNING COMPONENT:

Yes	x
No	

If yes, select [X] one or more of the following categories:

Classroom / Lab	x	Community Service	
Internship		Civic Engagement	
Clinical Practicum		Creative Works/Senior Project	
Practicum		Research	
Service Learning		Entrepreneurship [program, class, project]	

K. TEXTS:

R. C. Hibbeler, Structural Analysis, 11th Edition, Pearson – Prentice Hall, 2024.

L. REFERENCES:

ASCE 7, Minimum Design Loads for Buildings and Other Structures

M. EQUIPMENT:

Scientific calculator, scale/straight edge, engineering and Computer Laboratory.

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Exams
Quizzes
Term Project
Homework
Lab Projects

P. DETAILED COURSE OUTLINE:

a. Types of Structures and Loads
b. Statically Determinate Structures
   i. Determinacy and Stability
   ii. Truss Analysis
   iii. Shear and Moment Functions
   iv. Shear and Moment Diagrams for a Beam
   v. Shear and Moment Diagrams for a Frame
   vi. Influence Lines
   vii. Moving Loads
c. Deflections
   i. Beam Theory
   ii. Geometric Methods
   iii. Energy Methods (optional)
d. Statically Indeterminate Structures
   i. Approximate Analysis (optional)
   ii. Force Method
   iii. Displacement Method

iv. Influence Lines (optional)

e. Stiffness Method (optional)

Q. LABORATORY OUTLINE:

1. Structural Idealization and Geometric Model Setup

2. Material, Boundary Condition and Definitions

3. Structural Load Modeling
   a. Dead loads
   b. Floor and roof live loads
   c. Wind load
   d. Earthquake load (Optional)
   e. Snow load

4. Load Cases and Load Combinations
   a. ASCE LRFD load combinations
   b. ASCE ASD load combinations
   c. AASHTO LRFD load combinations
   d. AASHTO ASD load combinations

5. Model Validation and Structural Analysis Execution
   a. Approximate method
   b. Model validation
   c. Analytical module
   d. Static and dynamic analysis
   e. Lateral load distributions on shear walls

6. Structural Analysis Report
   a. Structural analysis results and discussions
   b. Structural analysis report