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

MASTER SYLLABUS

CONS 304 – Reinforced Concrete

CIP Code: 15.0201

Created by: Joseph Reilly
Updated by: Adrienne C. Rygel

School: Canino School of Engineering Technology
Department: Civil and Construction Technology
Implementation Semester/Year: Fall 2024

A. TITLE: Structural Steel Design

B. COURSE NUMBER: CONS 324

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

# Credit Hours per Week	**3**
# Lecture Hours per Week	**2**
# 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	
Spring	x
Fall and Spring	

G. COURSE DESCRIPTION:

An introduction to the theory, analysis and design of the elements that comprise structural steel buildings. Instruction follows the specifications and selection techniques provided in the American Institute of Steel Construction (AISC) Manual of Steel Construction. Subject areas include determination of controlling load combinations, analysis and selection of tension members, analysis and selection of flexural members, analysis and selection of compression members, fastener strength and connection design and combined bending and axial stresses (beam-columns).

H. PRE-REQUISITES:

CONS 336 (Structural Analysis) and CIVL 339 (Structural Analysis Lab); or permission of the instructor.

CO-REQUISITES: CIVL 339 (Structural Analysis Lab)

I. STUDENT LEARNING OUTCOMES:

Course Student Learning Outcome [SLO]	Program Student Learning Outcome [PSLO]	GER	ISLO & Subsets
a. Explain and implement both ASD and LRFD design philosophies.	SO 2, SO1		ISLO 1 and ISLO 5
b. Analyze and select tension members (x-bracing, truss members, and threaded rods) IAW AISC.	SO 2, SO1		ISLO 2 (PS) and ISLO 5
c. Analyze and select compression members (columns) IAW AISC.	SO 2, SO1		ISLO 2 (PS) and ISLO 5
d. Analyze and select flexural members (beams) IAW AISC.	SO 2, SO1		ISLO 2 (PS) and ISLO 5
e. Select the number of bolts and "workable" combinations for connections IAW AISC.	SO 2, SO1		ISLO 2 (PS) and 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:

K.

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

TEXTS:

Steel Design, 6th Ed., William T. Segui, (2017) Cengage Learning

L. REFERENCES:

AISC ASD/LRFD Manual of Steel Construction, current Edition.

M. EQUIPMENT: None

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Exams
Quizzes
Design Project(s)
Homework

P. DETAILED COURSE OUTLINE:

1. Introduction
    a. Steel Structures
    b. Handbooks and Specifications
    c. Steel Properties
    d. Design Considerations
    e. Load Paths f. LRFD theory
    g. ASD theory

2. Determining factored loads for LRFD

3. Tension Members
    a. Review of tensile stress
    b. Rupture limit state
    c. Fracture limit state
    d. Tension Member Analysis i. Net area ii. Effective Net Area iii. Length Effects
    e. Block Shear
    f. Design of Tension Members
    g. Threaded Rods in Tension

4. Axially Loaded Column
    a. Introduction
    b. Ideal Columns
    c. Effective Lengths from the LRFD
    d. AISC Resistance factors for Compression Members

e. Analysis of Columns (AISC) i. By formula □ ii. Using the column tables (LRFD)
f. Design of Axially Loaded Columns
g. Column Base Plates (Axial Load) (Optional)

5. Beams
   a. Review of the Mechanics of Bending (Moment diagrams)
   b. Plastic Hinge and Plastic Modulus (Z)
   c. Analysis of Beams based on Moment Strength
   d. Use of Beam Curves e. Inadequate Lateral Support
   f. Design of Beams based on Moment Strength
   g. Shear in Beams h. Deflection

6. Eccentrically Loaded Columns
   a. Introduction
   b. Analysis of Beam-Columns (AISC)
   c. Design of Beam-Columns (AISC)

7. Bolted Connections (Optional)
   a. Introduction
   b. Types of Bolted Connections
   c. High-Strength Bolts
   d. Strength and Behavior of High Strength Bolted Connections
   e. Framed Beam Connections
   f. Unstiffened Seated Beam Connections

Q. LABORATORY OUTLINE:

1. Tension Member Design
2. Compression Member Design
3. Beam Design
4. Bolt Design