

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



MASTER SYLLABUS

CONS 233 – Structural Drafting

CIP Code: 50.0201

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

A. TITLE: Structural Drafting

B. COURSE NUMBER: CONS 233

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

| | |
|--------------------------|----------|
| # Credit Hours per Week | 3 |
| # Lecture Hours per Week | 1 |
| # Lab Hours per Week | 4 |
| 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 preparation of drawings typically used in the structural design industry. The greatest emphasis is on the creation of structural steel details. Detailing of timber and reinforced concrete structures will also be presented and performed. The lab work engages the student with “AutoCad Revit” for structures. Building Information Modeling (BIM) is introduced. Some structural design is required.

H. PRE-REQUISITES:

SOET116 Introduction to Computer Aided Drafting and Design, and CONS 272 Strength of Materials for Engineering Technicians or ENGS 203 Strength of Materials, or permission of the instructor.

CO-REQUISITES:

None

I. STUDENT LEARNING OUTCOMES:

| Course Student Learning Outcome [SLO] | Program Student Learning Outcome [PSLO] | GER | ISLO & Subsets |
|---|---|-----|-----------------|
| a. Prepare structural detail drawings consistent in form and content with standard practice in the industry. | SO1 | | ISLO 1W, ISLO 5 |
| b. Apply principles of statics and strength of materials in the design and detailing of structural members and connections. | SO1 | | ISLO 5 |
| c. Employ professional reference manuals such as the AISC Manual for Steel Construction to assist with outcome 1. | SO1 | | ISLO 5 |
| d. Operate a computer drawing application such as AutoCad with proficiency in the preparation and printing of structural detail drawings. | SO1 | | ISLO 5 |
| e. | | | |

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

Suggested:

Structural Drafting , David L. Goetsch, Delmar, ISBN 13: 9780827363021

Structural Steel Drafting and Design, David MacLaughlin: Hector Estrada, Delmar Publishing, ISBN 13:9781401890322, 10:1401890326

L. REFERENCES: AISC American Institute of Steel Construction Manual of Steel Design

M. EQUIPMENT: computer lab computers

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Exams, Quizzes, Drawing assignments

P. DETAILED COURSE OUTLINE:

- I. Introduction
 - a. Definition
 - b. Types of Structural Drawings
 - c. Employers
 - d. Structural Drafting Techniques
 - e. Linework
 - i. Linetypes
 - ii. Lettering
 - iii. Use of scales
 - iv. Paper sizes
 - v. Title blocks and borders
- II. Structural Steel Drafting
 - a. Structural Steel Framing Plans
 - i. Structural Steel Drawings
 - ii. Structural steel framing products (W, C, etc)
 - iii. Long Span products (open web joists)
 - iv. Framing Plans
 - v. Drawing Framing Plans
 - b. Structural Steel Sections
 - i. Defined

- ii. Full, Partial and Offset Sections
 - iii. Section conventions
 - iv. Drawing Structural Steel Sections
 - c. Structural Steel Connection Details
 - i. Drawing Structural Steel Connection Details
 - d. Structural Steel Fabrication Details
 - i. Shop Drawings defined
 - ii. Detail/Fabrication drawings defined
 - iii. Construction Fabrication Details
 - e. Structural Steel Bill of Materials
 - i. Common conventions for adding bill of materials
 - f. Welds and welded connections
 - i. Types of welds
 - ii. Computing Strength of welds
 - iii. Using weld symbols in fabrication drawings
- III. III. Structural Poured in Place Concrete Frames
 - a. Poured in Place (PIP) Concrete Foundations
 - i. PIP Concrete Construction
 - ii. PIP concrete drawings
 - iii. Sheet Layout and Scales
 - iv. Mark Numbering Systems
 - v. Schedules
 - vi. PIP foundation drawings
 - b. PIP Concrete Walls and Columns
 - i. PIP Concrete Walls and Columns Explained
 - ii. Wall and column Engineering Drawings
 - iii. Wall and Column Placing Drawings
 - c. PIP Concrete Floor Systems
 - i. PIP Concrete Floor Systems Explained
 - ii. One way solid slab and beam
 - iii. One way ribbed or joist slab
 - iv. Two Way Solid Slab and Beam
 - v. Two Way Flat Plate Floor Systems
 - vi. Waffle Slab PIP
 - vii. Concrete Floor System Drawings
- IV. IV. Structural Wood Drafting
 - a. Structural Wood Floor Systems
 - b. Structural Wood Walls
 - c. Structural Wood Roofs
 - d. Timber Construction
 - i. Post and Beam Construction
 - ii. Laminated Arches
 - iii. Laminated Beams and Girders
 - iv. Post, Beam and Arch Drawings
 - v. Fasteners, connecting devices and methods

Q. **LABORATORY OUTLINE:**

- I. Introduction to Structural Drawing Techniques
 - a. Review of manual drafting methods, lettering, line types and scaling
 - b. Introduction to AutoCad Revit –
 - c. First drawing with Revit
- II. Structural Steel
 - a. Drawing Structural Steel Framing Plans
 - b. Drawing Structural Steel Sections
 - c. Drawing Structural Steel Connections
 - d. Creating Steel Fabrication Details
 - e. Steel Project
- III. Exam 1
- IV. Concrete
 - a. Drawing Structural Concrete Foundation Elements
 - b. Drawing PIP Concrete walls and columns
 - c. Drawing Concrete floors and beams
 - d. PIP Concrete project
- V. Exam 2
- VI. Wood Framing
 - a. Drawing Wood Floor system
 - b. Drawing Wood Wall system
 - c. Drawing Wood Roof system
 - d. Drawing Post and Beam Structural Elements
 - e. Timber Project
- VII. Final Exam Drawing