COURSE OUTLINE

CONS 233 - STRUCTURAL DRAFTING

Prepared By:  Joseph Reilly
CONS233 - STRUCTURAL DRAFTING

A. **TITLE:** STRUCTURAL DRAFTING

B. **COURSE NUMBER:** CONS233

C. **CREDIT HOURS:** 3

D. **WRITING INTENSIVE COURSE:** NO

E. **COURSE LENGTH:** 15 weeks

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

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

   1 hour lecture, 4 hours lab per week

H. **CATALOG 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.

I. **PRE-REQUISITES/CO-COURSES:**

Prerequisites: SOET116 Introduction to Computer Aided Drafting and Design or equivalent introductory course in the use of cadd, and CONS272 Strength of Materials for Engineering Technicians.

J. **GOALS (STUDENT LEARNING OUTCOMES):**

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

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<tr>
<th>Course Objective</th>
<th>Institutional SLO</th>
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<tr>
<td>a) Prepare structural detail drawings consistent in form and content with standard practice in the industry.</td>
<td>3. Professional Competence</td>
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<td>1. Communication</td>
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<td>b) Apply principles of statics and strength of materials in the design and detailing of structural members and connections.</td>
<td>3. Professional Competence</td>
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<td>c) Employ professional reference manuals such as the AISC Manual for Steel Construction to assist with outcome 1.</td>
<td>3. Professional Competence</td>
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<td>d) Operate a computer drawing application such as AutoCad with proficiency in the preparation and printing of structural detail drawings.</td>
<td>3. Professional Competence</td>
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K. **TEXTS:** Suggested texts include:


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

M. **EQUIPMENT:** Computer classroom/lab
N. **GRADING METHOD:** A - F

N. **MEASUREMENT CRITERIA/METHODS:**

- Exams
- Quizzes
- Drawing assignments

O. **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. **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. 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