COURSE OUTLINE

CONS 370 TIMBER DESIGN

Prepared By: Joseph Reilly
CONS 370 TIMBER DESIGN

A. TITLE: TIMBER DESIGN

B. COURSE NUMBER: CONS370

C. CREDIT HOURS: 3

D. WRITING INTENSIVE COURSE: NO

E. COURSE LENGTH: 15 WEEKS

F. SEMESTER(S) OFFERED: Fall

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

   2 – one hour lectures and 1 – 2 hour recitation per week

H. CATALOG DESCRIPTION:

   The dimensional features, structural properties and behavior under load of wooden structural members are presented. Students learn standard methods for the analysis and design of timber-framed structural elements including beams, joists, rafters, posts (columns), braces, gussets and fasteners. Load and Resistance Factor Design and Allowable Strength Design are employed. Use and selection of engineered lumber products such as glu-lams and laminated veneer lumber is included.

I. PRE-REQUISITES:

   CONS 336 (Structural Analysis)

J. GOALS (STUDENT LEARNING OUTCOMES):

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

<table>
<thead>
<tr>
<th>Course Objective</th>
<th>Institutional SLO</th>
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<tbody>
<tr>
<td>a) Determine loads to be used in the design of residential and non-residential</td>
<td>3. Professional Competence</td>
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<td>light and heavy wood framed structures from references such as ASCE 7, NYS</td>
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<td>Building Code, ICBO</td>
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<tr>
<td>b) Select repetitive flexural members (joists, rafters) for use in wood frame</td>
<td>3. Professional Competence</td>
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<td>structures from tables.</td>
<td>2. Critical Thinking</td>
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<td>c)</td>
<td>Determine the required size of timber beams</td>
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<td>d)</td>
<td>Determine the size and spacing of rectangular “columns”</td>
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<td>e)</td>
<td>Specify the number of fasteners required in a connection</td>
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<td>f)</td>
<td>Analyze a wood truss</td>
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<td>g)</td>
<td>Analyze a diaphragm in a wood framed structure</td>
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<td>h)</td>
<td>Discuss the important properties of timber</td>
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L. **REFERENCES**: International Building Code, New York State Building Code, ASCE – 7

M. **EQUIPMENT**: No special equipment is required of the student.

N. **GRADING METHOD**: A - F

O. **MEASUREMENT CRITERIA/METHODS**:

- Exams
- Homework Assignments
- Projects

P. **DETAILED COURSE OUTLINE**:

I. Material properties
   A. Lumber Strength
   B. Lumber Defects
   C. Design Factors
   D. Load Calculations

II. Flexural Member (Beam) Design
   A. Joist Design
      i. Use of Joist Tables
   B. Bearing Stress Consideration
   C. Timber Beams
   D. Effects of Lateral Support
   E. Shear Stress Considerations
      i. Notches
F. Flitched Beams
G. Plywood Composite Beams
H. Glu-Lam Beams

III. Design of Axial loaded Members
   A. Buckling Formulas
   B. Long, Intermediate, and Short Columns
   C. Round Columns
   D. Braced Columns
   E. Built-up Columns
   F. Column Spacing
   G. Beam-Columns
   H. Eccentric Loading Effects
   I. Braces in Tension

IV. Connections
   A. Fastener spacing
   B. Wind Uplift Analysis
   C. Metal connectors
   D. Connection Design
   E. Nails and nailing
   F. Screws

V. Wood Trusses
   A. Top Chord Analysis
   B. Bottom Chord Analysis
   C. Web Members
   D. Truss Plates
   E. Truss Bracing Requirements

VI. Glue-Lam Arches
   A. Graphical Analysis

VII. Diaphragms
   A. Plywood and panel products
   B. Shear Wall Design and Analysis
   C. Stressed Skin Panels
   D. Structural Insulated Panels

Q. LABORATORY OUTLINE:

NA – The 2 hour session will not be operated as a traditional lab. Rather the additional time will allow the instructor to engage the student in lengthy problem solutions associated with current lecture topics.