

**SAULT STE. MARIE, ON
SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

COURSE OUTLINE

COURSE TITLE: STRUCTURAL DESIGN

CODE NO.: CIV319 **SEMESTER:** VI

PROGRAM: CIVIL ENGINEERING TECHNOLOGY

AUTHOR: D. J. ELLIOTT

DATE: JAN, 1995 **PREVIOUS OUTLINE DATED:** JANUARY, 1994

APPROVED: *D. J. Elliott* 95-01-03
DEAN **DATE**

M. Chen
Jan 3/95

STRUCTURAL DESIGN
COURSE NAME

CIV319
COURSE CODE

TOTAL CREDIT HOURS: 64

PREREQUISITE(S): MCH212

I. PHILOSOPHY/GOALS:

This course will provide the student with a basic knowledge of the design of structural elements in wood, including beams, columns, walls, floor systems and connections. The design of wooden structures will be demonstrated by investigating a small commercial building. Additional instruction will involve the use of computer programs in structural design.

II. STUDENT PERFORMANCE OBJECTIVES (OUTCOMES):

Upon successful completion of this course the student will:

- 1) Present basic structural components in AutoCAD, three dimensions.
- 2) Demonstrate a working knowledge of structural design and spreadsheet software
- 3) Demonstrate a working knowledge of the Ontario Building Code regarding loading and fire protection measures
- 4) Demonstrate a working knowledge of the Wood Design Manual and appropriate codes
- 5) Analyze beams and floors in wood
- 6) Analyze columns and walls in wood
- 7) Utilize computer software for design in wood

III. TOPICS TO BE COVERED:

- 1) Structural drawing in AutoCAD, 3D
- 2) Structural design software and Spreadsheet applications
- 3) Building Code References
- 4) Flexural and shear design, and deflection control in wood
- 5) Analysis and design of beams, decking and floors in wood
- 6) Analysis and design of columns, walls and connections in wood
- 7) Computer Aided Design in wood

IV. LEARNING ACTIVITIES/REQUIRED RESOURCES

1. Structural Drawing in AutoCAD, 3D

Learning Activities: In class working example of a structural steel building in three dimensions
- Appropriate Commands, 3D symbols
- Presentation plan

Resources: Handouts and Tutorials

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2. Structural Design Software

Learning Activities: In class instruction examples and exercises
- PFRAME structural analysis software
- Spreadsheet software and applications

Resources: Software documentation, handouts and reference material

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3. Building Code References

Learning Activities: Introduction to a small commercial building example
- Develop loadings for example building
- Fire protection requirements
- Reference to Building Code throughout example

Resources: Wood Design Manual
Ontario Building Code and handouts

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4. Stresses and Deflections in Wood

Learning Activities: In class overview of Wood Design Manual and design procedures

Resources: Wood Design Manual
Ontario Building Code

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5. Design of Beams, Decking and Connections in Wood

Learning Activities: In class instruction and problem sets on flexural analysis, shear design and deflection control on:
- Glulam beams
- Tongue and groove decking
- Sawn timber roof purlins
- Structural composite lumber
- Wood I-joists

Resources: Wood Design Manual

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6. **Design of Columns Walls and Connections in Wood**

Learning Activities: In class instruction and problem sets on analysis and design of
 - Glulam columns
 - Exterior stud walls
 - Connections

Resources: Wood Design Manual

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7. **Computer Aided Design in Wood**

Learning Activities: In class examples and problem sets on the design of beams and columns

Resources: Software and documentation

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V. **EVALUATION METHODS: (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS, ETC.)**

A final grade will be derived as follows:	Assignments	40%
	Term Tests (4 @ 15%)	60%
	Total	100%

The grading system used will be as follows:

A+	90% - 100%
A	80% - 89%
B	70% - 79%
C	55% - 69%
R	Repeat

- 1) Late assignments will be penalized 10% for each day late.
- 2) Minimum acceptable grade for this course is 55%.
- 3) If at the end of the semester the overall mark is below 55%, then it will be up to the instructor whether or not a rewrite test will be granted. The criteria employed for arriving at that decision is class attendance, class participation and overall grade, which should be at least 45%.
- 4) In the case a rewrite is granted, it will be permitted only once, it will cover the entire course outline and will limit the maximum obtainable grade for the course to 60%.

VI. REQUIRED STUDENT RESOURCES

Required Texts Canadian Wood Council; Wood Design Manual, 1990
Kraynak, Joe; 10-Minute Guide to Quattro-Pro IV, Sams

VII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY:

Book Section Ontario Building Code
Software Documentation as required

VIII. SPECIAL NOTES

Students with special needs (eg. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.

