

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON

COURSE OUTLINE

COURSE TITLE: STRUCTURAL ENGINEERING

CODE NO.: CIV309 **SEMESTER:** V

PROGRAM: CIVIL ENGINEERING TECHNOLOGY

AUTHOR: D. J. ELLIOTT

DATE: SEPT 1994 **PREVIOUS OUTLINE DATED:** SEPT 1993

APPROVED: *L. Pignatta* *94-08-20*
DEAN **DATE**

M. Chane Aug 24/94

TOPICS TO BE COVERED:

- 1) Introduction to General Types of Structures
- 2) General Principles of Design
- 3) Review of Statistically Determinate Structures
- 4) Approximate Methods of Analysis
- 5) Moment Distribution Method
- 6) Influence Lines
- 7) Computer Applications in Structural Analysis

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TOTAL CREDIT HOURS: 64

PREREQUISITE(S): MCH212

I. PHILOSOPHY/GOALS:

The student will combine his/her understanding of basic mechanics with additional analytical skills in principles of structural design, and investigating statically indeterminate structures. Topics will include basic principles of structural systems and design, approximate methods of analysis, moment distribution, influence lines and computer applications in structural analysis.

II. STUDENT PERFORMANCE OBJECTIVES (OUTCOMES):

Upon successful completion of this course the student will:

- 1) Relate the basic principles in the field of mechanics to understanding the behaviour of structures
- 2) Investigate general principles of structural analysis and design, including appropriate sections of the building code
- 3) Differentiate between statically determinate and statically indeterminate structures
- 4) Analyze and resolve problems involving statically indeterminate beams and frames using approximate methods
- 5) Analyze and resolve problems involving statically indeterminate beams and frames using moment distribution
- 6) Analyze and resolve problems using influence lines
- 7) Identify the various computer applications and methods available for structural analysis and design

III. TOPICS TO BE COVERED:

- 1) Introduction to General Types of Structures
- 2) General Principles of Design
- 3) Review of Statically Determinate Structures
- 4) Approximate Methods of Analysis
- 5) Moment Distribution Method
- 6) Influence Lines
- 7) Computer Applications in Structural Analysis

IV. LEARNING ACTIVITIES/REQUIRED RESOURCES

1. Introduction

Learning Activities: In class instruction and problem sets on:
- General types of Structures
- Structural Classifications
- Structural Components

Resources: Notes and handouts
Chapter 1

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2. General Principles in Design

Learning Activities: In class instruction and problem sets on
- Analysis and Design
- Loads on Structures
- Structural Representation, Modelling the Structure
- Ontario Building Code
- Health and Safety Requirements

Resources: Notes and handouts
Chapter 2

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3. Review of Statics

Learning Activities: In class review and problem sets on
- Statically Determinate Structures
- Shear and Moment Diagrams

Resources: Chapters 2 and 4

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4. Approximate Methods

Learning Activities: Introduction, in class instruction and problem sets on
- Approximate Analysis of Continuous Beams
- Approximate Analysis of Rigid Frames
- The Portal Method
- The Cantilever Method

Resources: Chapter 7
Notes and handouts

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5. Moment-Distribution Method

Learning Activities: Introduction, in class instruction and problem sets on

- Development of the Method
- Basic Terminology
- Moment Distribution for Continuous Beams
- Moment Distribution for Rigid Frames

Resources: Chapter 10

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6. Influence Lines

Learning Activities: Introduction, in class instruction and problem sets on

- Basic concepts and uses for influence lines
- Applications of influence Lines

Resources: Chapter 8

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7. Computer Applications

Learning Activities: In class instruction and hands on problem solving using appropriate software for engineering applications

Resources: Computer Software and Documentation
Handouts and Computer Demonstrations in class

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

A final grade will be derived as follows:

Assignments	20%
Two term tests each worth 25%	50%
Final Test	30%
Total	100%

The grading system used will be as follows:

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

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- 1) Minimum acceptable grade for this course is 55%.
- 2) 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%.
- 3) 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 Text: Structural Analysis and Behaviour
F. Arbabi
McGraw Hill

VII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY:

Book Section Structures
Daniel L. Schodek
Prentice Hall

Ontario Building Code

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.

