SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COJRSE OUTLINE

Course title: STRENGTH OF MATERIALS

Code No.: NCH 212

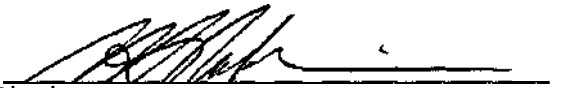
Program: CIVIL AND ARCHITECTURAL TECHNICIAN

Semester: THREE

Date: SEPTEMBER 1987

Author: S. IENCO

New: Revision

Approved; 

Chairperson Date/

STRENGTH OF MATERIALS MCH 212

Course Name Course Number

PHILOSOPHY/GOALS:

The general objectives of the course is to develop a basic working knowlwdge of Strength of Materials. This will enable the student to understand and solve basic strength of materials and structural problems at the Technician level.

METHODS OF ASSESSMENT:

Quizes	30%
Mid semester Examination	30%
Final examination	40%
	100%

A+	90% - 100%
A	80% - 89%
B	70% - 79%
C	55% - 69%
R	Repeat
X	A temoprary grade, limited t< circumstances, giving a student additional time to complete the requirements of the course.

1) Minimum acceptable grade is 55%

2) The in class quizes will cover one or two problems on a specific topic and are worked under examination conditions. Notice of a quiz is given during class at least two days in advance. Each quiz will carry the same weight.

3) Homework problems are assigned during lecture and the solution to selected problems is discussed subsequently. They are not graded.

4) If at the end of the semester your overall average of the combined quizes, mid semester test and final test is below 55%, then it will be up to the instructor whether you receive an "R" repeat or a re-write. The criteria employed for arriving at that decision is class attendance, class participation and overall grade.

5) In case a re-write is granted it will be permitted only once and will be subjected to the following conditions.

   a. it will cover the entire semesters course outline
   b. the maximum obtainable grade is "C"
   c. the re-write grade weight is 100%
   d. the student must score a 60% overall average on the re-write in order to obtain a "C" grade.

PREREQUISITE: Applied Mechanics (MCH 100)

TEXT: Applied Strength of Materials
Jensen/Chenoweth
McGraw-Hill

CIVIL AND ARCHITECTURAL ENGINEERING

MCH 212

TOPIC NO.	TOPIC	DESCRIPTION
1.	Statics Review	

- Forces and units
- Vectors
- Reactions
- Frameworks
- Moments

Stress Strain Relationships

- Definitions
- Tensile, compressive and shear stresses
- Poisson's ratio
- Strain definitions
- Young's modulous of elasticity
- Factors of safety
- Thermal stresses

Thin walled vessels

- Definitions
- Formulas

Centroids and Moment of Inertia

- Centroids
- First moment of areas
- Second moment of areas
- Parallel axes theorem
- Moments of Inertia
- Radius of Gyration

Stresses in simple Beams

- Types of beams and loadings
- Beam supports
- Shear diagram
- Moment diagrams
- Moving loads
- Flexure formula

MCH 212

Cont'd

TOPIC NO.	TOPIC DESCRIPTION
6.	Torsion - Twisting moment - Torsion formula - Polar moment of Inertia - Angle of twist

COURSE OBJECTIVES

MCH 212

Statics Review

1. Determine reactions in frameworks.
2. Analyisis of trusses by graphical method.
3. Analysis of frameworks by mathematical method (sections, joints).

Stress and strain relationships

1. Define stress.
2. Define tensile, compressive and shearing stresses.
3. Define ultimate stress, allowable stress and factor of safety.
4. Acquire a working knowledge of both imperial and SI units.
5. Solve problems using the direct stress formula.
6. Define strain.
7. Understand the relationship of the stress strain curve.
8. Define elastic limit, yield point, ultimate strength, permanent set and percent elongation.
9. Define Hooke's Law.
10. Formulate the equation to determine deformation for members subjected to axial loads.
11. Solve problems in deformation for one material under axial load.
12. Solve problems in deformation for two materials in series under axial loads.
13. Solve problems in deformation for two materials in parallel.
14. Identify Poisson's ratio.
15. Solve problems using Poisson's ratio
16. Define thermal expansion and contraction.
17. Solve problems for temperature stress.

Thin Walled Vessels

1. Identify thin walled pressure vessels.
2. Define stresses in the longitudinal and circumferential direction.
3. Develop the stress formulas.
4. Solve simple problems for thin walled vessels.

Centroids and Moment of Inertia

1. Calculate centroids for simple and irregular rectangular, circular and triangular shapes.
2. Calculate centroids for built up structural shapes.
3. Identify moment of inertia.

COURSE OBJECTIVES

MCH 212

Cont'd.

Centroids and Moment of Inertia

4. Define section modulous and calculate it.
5. Define radius of gyration and calculate it.
6. Identify the flexure formula.
7. Solve simple problems using the flexure formula.

Sresses in Simple Beams

1. Identify point, concentrated and U.D.L. loads.
2. Identify different beam supports.
3. Calculate reactions for simple beams under various loading conditions.
4. Calculate shear in simple beams.
5. Calculate moments in simple beams.
6. Draw shear force and bending moment diagrams.
7. Solve for maximum bending moment.
8. Calculate shear and maximum bending moment for moving loads.

Torsion

1. Identify torque; acting and resisting.
2. Identify the torque formula.
3. Identify the maximum unit shearing stress formula.
4. Identify the formula for polar moment of inertia of solid and hollow shafts.
6. Identify the angle of twist formula.
7. Solve problems using the above formulas.