SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	STRUCTURES		
CODE NO. :	CIV225	**SEMESTER:**	FOUR
PROGRAM:	CIVIL TECHNICIAN		
AUTHOR:	SAL IENCO		
DATE:	JANUARY 2013	**PREVIOUS OUTLINE DATED:**	JANUARY 2012
APPROVED:	*"Corey Meunier"*		
	CHAIR		**DATE**
TOTAL CREDITS:	4		
PREREQUISITE(S):	MCH 212		
HOURS/WEEK:	4		

For additional information, please contact C. Meunier, Chair
School of Technology & Skilled Trades
(705) 759-2554, Ext.2610

I. COURSE DESCRIPTION:

You are surrounded by a wide variety of structures such as buildings, bridges, and dams. These structures play such an important role in our lives that we cannot ignore them. As a technician, you will need to know this subject well enough to intelligently facilitate communication between designers and construction personnel.

This Structures course explores mathematical expressions which have been developed to describe how various elements of structures work. But at the same time every effort is made to link the mathematical expression to structural function. To that end you are encouraged to visually appreciate various structures in your community while understanding the mathematical relationships found in structures.

This course is a continuation of MCH100 and MCH212.

II. LEARNING OUTCOME:

1. Demonstrate relevant mathematical, computer and technical problem solving skills as it relates to civil engineering / construction projects.

2. Demonstrate an understanding of the working roles and inter-relationships required to adhere to the objectives of the project and work in accordance to labor-management principles and practices

TOPIC OUTLINE

Outcome	Topic and Content	Reading	Week
1,2	**1. Shear Forces and Bending Moment in Beams** 1.1 Real Life Examples of Shear and Bending Moment in Beams 1.2 Free Body Diagram 1.3 Semi-Graphical Method for Constructing Shear and Moment Diagrams 1.4 Triangular loads on Beams 1.5 Cantilevered Beams 1.6 Laboratory #1 – Beam Behavior 1.7 Summarize Shear Force & Bending Moment in Beams Topic 1.8 Applied Learning Activity	Chapter 8 LMS Handout	1

Outcome	Topic and Content	Reading	Week
1,2	**2. Bending and Shear Stresses in Beams** 2.1 Real Life Examples of Strain Applications 2.2 Free Body Diagram 2.3 Flexural Strain 2.4 Flexural (Bending) Stress Equation 2.5 Section Modulus 2.6 Shear Stress – Longitudinal and Transverse 2.7 Relationship Between Transverse and Longitudinal Shearing Stress 2.8 General Shear Stress Equation 2.9 Simplified Shear Stress Equation for Rectangular Cross Sections 2.10 Shearing Stress Variations in Beams 2.11 Simplified Shearing Stress for W Sections 2.12 Deflection in Beams 2.13 Deflection Formulas 2.14 Lateral Buckling in Beams 2.15 Summarize Bending and Shear Stress in Beams Topic 2.16 Applied Learning Activity 2.17 Assignment #1,2	Chapter 9 LMS Handout	2-5
1,2	**3. Load Tracing/Beam Design** 3.1 Real Life Examples of Load Tracing 3.2 Loads on Structures 3.3 Building Codes 3.4 Load Paths and Framing Systems 3.5 Framing Design Criteria: Direction of Span 3.6 Load Paths: Pitched Roof Systems 3.7 Construction: Pitched Roof Systems 3.8 Load Paths: Wall Systems 3.9 Load Paths: Roof and Floor Systems 3.10 Load Path: Foundation Systems 3.11 Load Tracing of Determinate Floor and Roof Systems 3.12 Applied Learning Activity 3.13 Assignment #3	Chapter 5 LMS Handout	6
1,2	**4. Mid Term Test** 4.1 Review 4.2 Mid Term Test	Chapter 5,8,9 LMS Handout	7
1,2	**5. Load Tracing/Beam Design** 5.1 Real Life Examples of Beam Design Topic 5.2 Working Strength Design Versus Limit States Design 5.3 Wood Beam Design	Chapter 5 LMS Handout	8-9

		5.4 Steel Beam Design 5.5 Assignment #4		
1,2	**6.**	**Column Analysis and Design** 6.1 Real Life Examples of Column Topic 6.2 Short and Long Columns – Modes of Failure 6.3 Euler Buckling of Long Columns 6.4 Slenderness Ratio 6.5 End Support Conditions and Lateral Bracing 6.6 Intermediate Lateral Bracing 6.7 Axially Loaded Steel Columns 6.8 Analysis of Steel Columns 6.9 Design of Steel Columns 6.10 Axially Loaded Wood Columns 6.11 Analysis of Wood Columns 6.12 Design of Wood Columns 6.13 Columns Subjected to Combined Loading and Eccentricity 6.14 Assignment #5	Chapter 10 LMS Handout	10-12
1,2	**7.**	**General Principles of Structural Design** 7.1 Real Life Examples of General Principles of Structural Design Topic 7.2 Characteristics of Structural Hierarchies. 7.3 Basic Design Issues for the Effects of Lateral Forces on Low and Medium-rise Structures. 7.4 Constructional Approaches for Wood, Steel and Reinforced Concrete Structural Systems. 7.5 Applied Learning Activity 7.6 Assignment #6 – Small Building Design	Chapter 8 LMS Handout	13-14
	8.	**Review/Looking Forward/Final Test** • Review • Looking Forward to Additional Structures Course • Final Test		15

REQUIRED RESOURCES/TEXTS/MATERIALS:

Statics and Strength of Materials Foundations for Structural Design
Barry Onouye

EVALUATION PROCESS/GRADING SYSTEM:
You will be assigned a final grade based on successful completion of laboratories, assignments and tests, weighted as follows:

Laboratories/Assignments/Quizzes	40%
Mid Term Test	30%
Final Test	30%
TOTAL	**100%**

Each laboratory/assignment/quiz carries equal weight. Late submittals receive only a maximum grade of 60%. However, laboratories or assignments handed in later that one week will receive a grade of 0%.

An average of 50% on laboratories/assignments and 50% on tests is required for successful completion of this course.

The following semester grades will be assigned::

Grade	Definition	Grade Point Equivalent
A+	90 - 100%	4.00
A	80 - 89%	4.00
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

Assignments and Examination Policy:

- If a student is unable to write a test or exam at the scheduled time the following procedure shall apply:
- The student shall provide the professor with advance notice (in writing) of the need to miss the test
- The student shall provide documentation as to the reason for the absence and the make-up will be at the discretion of the professor.
- Upon return the student is responsible to make arrangements for the writing of the test. This arrangement shall be made prior to the next schedule class.
- In the event of an emergency, the student shall telephone the professor as soon as possible at 759-2554, to notify of the absence. If the professor is not available, the college has a 24 hour voice mail system.
- In the event of a test missed due to emergency, the student shall provide documentation from a professional such as doctor or lawyer.
- All late assignments (without documentation) will receive a maximum grade of C (60%).

VI. SPECIAL NOTES:

Attendance:
Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will not be granted admission to the room.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.