SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	MECHANICS OF MATERIALS		
CODE NO. :	MCH212	**SEMESTER:**	THREE
PROGRAM:	CIVIL ENGINEERING TECHNICIAN		
AUTHOR:	SAL IENCO		
DATE:	SEPT 2011	**PREVIOUS OUTLINE DATED:**	SEPT 2010
APPROVED:	*"Corey Meunier"*		
	CHAIR		**DATE**
TOTAL CREDITS:	FOUR		
PREREQUISITE(S):	MCH100		
HOURS/WEEK:	FOUR		

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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 Mechanics of Materials 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 leads to CIV225.

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 labour-management principles and practices*

III. TOPIC OUTLINE

Outcome	Topic and Content	Reading	Week
1,2	**1. Stress** 1.1. Real Life Examples of Stress Applications 1.2. Definition of Stress 1.3. Building Big (PBS) Force Lab 1.4. Simple Stress Formula 1.5. Axial Stress 1.6. Bearing Stress 1.7. Shear Stress 1.8. Free Body Diagram 1.9. Summarize Stress Topic 1.10. Applied Learning Activity 1.11. Assignment #1	Chapter 6 LMS Handout	1

1,2	**2. Strain** 2.1. Real Life Examples of Strain Applications 2.2. Definition of Strain 2.3. Internet Resources 2.4. Strain Formula 2.5. Elastic Deformation in Tension and Compression Members 2.6. Free Body Diagram 2.7. Summarize Strain Topic 2.8. Applied Learning Activity 2.9. Quiz #1	Chapter 6 LMS Handout	2
1,2	**3. Stress and Strain** 3.1. Real Life Examples of Stress Strain Relationships 3.2. Hooke's Law 3.3. Modulus of Elasticity 3.4. Spring Constant Practical Investigation 3.5. Tensile test theory and application 3.6. Free Body Diagram 3.7. Summarize Stress Strain Topic 3.8. Applied Learning Activity 3.9. Laboratory 1 – Tensile Test	Chapter 6 LMS Handout	3,4
1,2	**4. Thermal Stress** 4.1. Real Life Examples of Thermal Stress 4.2. Deformation Due to Temperature Changes 4.3. Thermal stress theory 4.4. Free Body Diagram 4.5. Applied Learning Activity 4.6. Assignment # 2	Chapter 6 LMS Handout	5
1,2	**5. Torsion/ Factor of Safety** 5.1. Real Life Examples of Torsion 5.2. Implication of Torsion on Structural Components 5.3. Torsional Stresses 5.4. Factors of Safety in Design 5.5. Applied Learning Activity 5.6. Quiz #2	Chapter 6 LMS Handout	6
	6. Mid-term Test		7
1,2	**7. Centroids** 7.1. Real Life Examples of Centroids 7.2. Practical Demonstration For Determining Centroids 7.3. Centroids – Simple Shapes 7.4. Centroids of Complex Shapes	Chapter 7 LMS Handout	8

		7.5. Manual Calculations of Centroids 7.6. Using AutoCAD to Determine Centroids 7.7. Applied Learning Activity 7.8. Quiz #3		
1,2	**8.**	**Moment of Inertia** 8.1. Real Line Examples of Moment of Inertia 8.2. Moment of Inertia of an Area 8.3. Manual Calculations of Moment of Inertia 8.4. Using AutoCAD to Determine Moment of Inertia 8.5. Applied Learning Activity 8.6. Assignment #3	Chapter 7 LMS Handout	9
1,2	**9.**	**Shear Forces and Bending Moments in Simple Beams With Point Loads** 9.1. Real life Examples of Simple Beams With Point Loads 9.2. Beam Loading, Supports and Beam Types 9.3. Free Body Diagram of Beam 9.4. Mathematical Analysis of Beam 9.5. Shear and Bending Moment for Concentrated loads 9.6. Semi-Graphical Method for Drawing Shear and Moment Diagrams 9.7. Applied Learning Activity 9.8. Quiz #4	Chapter 8 LMS Handout	10
1,2	**10.**	**Shear Forces and Bending Moments in Simple Beams With Distributed Loads** 10.1. Real Life Examples of Beams With Distributed Loads 10.2. Free Body Diagram of Beam 10.3. Mathematical Analysis of Beam 10.4. Shear and Bending Moment Diagrams for Distributed Loads 10.5. Semi-Graphical Method for Drawing Shear and Moment Diagrams 10.6. Applied Learning Activity 10.7. Assignment # 4	Chapter 8 LMS Handout	11
1,2	**11.**	**Shear Forces and Bending Moments in Simple Beams With Combination Loads** 11.1. Real Life Examples of Beams With Combination Loads 11.2. Free Body Diagram of Beam 11.3. Mathematical Analysis of Beam 11.4. Shear and Bending Moment Diagrams for Combined Loads	Chapter 8 LMS Handout	12

	11.5. Semi-Graphical Method for Drawing Shear and Bending Moment Diagrams 11.6. Applied Learning Activity 11.7. Assignment #5		
1,2	**12. Shear Forces and Bending Moments in Overhanging Beams** • Real Life Examples of Overhanging Beams • Free Body Diagram of Beam • Mathematical Analysis of Beam • Shear and Bending Moment Diagrams • Semi-Graphical Analysis for Drawing Shear and Bending Moment • Applied Learning Activity	Chapter 8 LMS Handout	13
	13. Review/Looking Forward/Final Test • Review • Tie in Between MCH212 and Structures Course		14-15

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Statics and Strength of Materials Foundations for Structural Design
Barry Onouye

V. 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%.

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 705.759.2554, 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 department policy that once the classroom door has been closed, the learning process has begun. Late arrivers may 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.