

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.

I 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

I REQUIRED RESOURCES/TEXTS/MATERIALS:

Statics and Strength of Materials Foundations for Structural Design
Barry Onouye

Interactive Structures – Visualizing Structural Behavior
Shahin Vassigh

I 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	<u>30%</u>
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 than 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::

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
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.	

V SPECIAL NOTES:

Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

Substitute course information is available in the Registrar's office.

Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade “C”, (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations, in addition to announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more. Go to <https://my.saultcollege.ca>.

Electronic Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

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. Late arrivers may not be granted admission to the room.

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

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%).

V 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 5.4 Steel Beam Design 5.5 Assignment #4	Chapter 5 LMS Handout	8-9

Outcome	Topic and Content	Reading	Week
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 <ul style="list-style-type: none"> • Review • Looking Forward to Additional Structures Course • Final Test 		15