

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: STRUCTURES

CODE NO. : CIV 225 **SEMESTER:** 4

PROGRAM: CIVIL ENGINEERING TECHNCIAN

AUTHOR: S. IENCO

DATE: Dec-05 **PREVIOUS OUTLINE DATED:** Jan-04

APPROVED:

	_____	_____
	DEAN	DATE
TOTAL CREDITS:	4	
PREREQUISITE(S):	MCH 212	
LENGTH OF COURSE:	16 WEEKS	TOTAL CREDIT HOURS: 64

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I. COURSE DESCRIPTION:

This course provides you with a general understanding and overview of structures. You will combine the basic understanding gained in your statics and strength of materials courses with additional skills to analyze and design structural elements such as beams, columns, tensile members, and base plates. The interaction of these various components will be emphasized by designing the main structural components for a simple building.

The WoodWorks Sizer Software package will be utilized as a tool to enhance the learning process. Approximate methods of analyzing indeterminate beams and frames are introduced.

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.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Relate the basic principles of statics to understanding the behavior of structures.

Potential Elements of the Performance:

- Identify general types of structures.
- Classify structures.
- Identify primary structural elements.
- Discuss basic issues in the analysis and design of structures.
- Produce a scaled model of a simplified structure.

2. Investigate general principles of structural analysis and design, including appropriate sections of the building code.

Potential Elements of the Performance:

- Differentiate between analysis and design of structures.
- State, define and determine live and dead loads applied to buildings using the appropriate codes.
- Identify the basic steps in the analysis of structures.
- Model the physical structure on paper for analysis purposes.
- Model the external loading on a structure.

3. Analyze and design statically determinate beams.

Potential Elements of the Performance:

- Review the three equations of equilibrium.
- Review shear and moment diagrams for simply supported beams.
- Review shear and flexural formulas.
- Identify major beam failure modes.
- Calculate bending stresses in beams.
- Calculate shear stresses in beams.
- Calculate beam deflections.
- Identify general beam design principles.
- Design simple beams.

4. Analyze and design members in compression: columns.

Potential Elements of the Performance:

- Identify types of column cross sections.
- Summarize and employ Euler's formula.
- Identify and interpret effects of column end restraints.
- Identify column and connecting components of an actual building.
- Design columns with axial loads only.
- Design columns with combined bending and axial loads.

5. Analyze indeterminate beams and frames using approximate methods.

Potential Elements of the Performance:

- Discuss the approximate versus the exact method of analysis.
- Perform approximate analysis calculations for continuous beams
- Perform approximate analysis calculations for rigid frames using the Portal Method.

6. Qualitatively discuss and investigate the general principles of structural design.

Potential Elements of the Performance:

- Discuss the general characteristics of structural hierarchies.
- Discuss basic design issues for the effects of lateral forces on low and medium-rise structures.
- Compare the constructional approaches for wood, steel and reinforced concrete structural systems.

III. TOPICS:

1. Overview of Structures
2. Introduction to Structural Analysis and Design
3. Analysis and Design of Beams
4. Analysis and Design of Columns
5. Analysis of Statically Indeterminate Beams and Frames
6. Principles of Structural Design

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Interactive Structures – Visualizing Structural Behaviour
Shahin Vassigh

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	30%
Two term tests of equal weight	40%
Final Test	<u>30%</u>

TOTAL 100%

Each laboratory/assignment/quiz carries equal weight. Late submittals receive only a maximum grade of 50%. 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 to students:

<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% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
U	Unsatisfactory achievement in field placement or non-graded subject areas.	
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.	

VI. SPECIAL NOTES:

Special Needs:

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

Retention of course outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

VII. ACADEMIC / CLASSROOM CONDUCT

Introduction: Sault College students, faculty members, employees and Ray Lawson Hall Residents constitute an academic community committed to training and education that will enhance effectiveness in the workplace and quality of life. The College community expects all members to discipline themselves, individually and collectively, and it requires adherence to the standards of conduct appropriate for an academic community.

Sault College considers its students adults and as such obligated to make responsible decisions. The Student Code of Conduct exists to assist in the effort of providing the best possible learning and living environment for all students. It is the obligation of students to treat all other members of the academic community with dignity and respect – including other students, faculty members, employees, visitors and neighbours of the College. The enforcement of the Student Code of Conduct is critical to the existence of such an environment for all members of the academic community. Ignorance of the rules or of the law is not a defence against disciplinary action. The College reserves all rights to criminal action where it deems necessary. Lack of intention to violate College policy will not generally excuse an infraction.

Academic Dishonesty:

Students shall submit written or other work in a course that shall be the product of their own efforts. "Academic Dishonesty" includes, but is not limited to, the following:

- a. Copying from another student's paper.
- b. Using material not authorized by the person administering the test or assignment.
- c. Collaborating with another student during a test without permission.
- d. Plagiarism (i.e. representing the work of another, as one's own, inclusive of purchases of a commercial nature).
- e. Collusion (i.e. obtaining from or giving to another student unauthorized assistance in course work).
- f. Falsification (i.e. modification, without authorization, of any examination paper, record, assignment, or report).
- g. Knowingly using, buying, selling, stealing, or soliciting contents of a test, examination paper, record, assignment, or report.
- h. Representing oneself as another student for the purpose of taking a test or examination or allowing oneself to be represented by another for the same.
- i. Attempting to bribe or otherwise coerce a professor/instructor to obtain favours.
- j. Cheating (i.e. any misrepresentation by a student of their performance in a College subject for the purpose of obtaining credit to which they are not entitled).
- k. Any act designated by the President or his/her designate.

(Student Code of Conduct – Article 2, Section 2)

Attendance:

Students are expected to attend 100% of their classes. Attendance will be recorded within the first 15 minutes of each class.

Leaving or Entering During Class:

Students should exercise respect for faculty and students when leaving or entering a class that is already in session. Leaving or entering should be done with a minimal amount of interruption.

Disruption:

Students shall not obstruct or disrupt, or attempt to obstruct or disrupt, teaching, administration, disciplinary procedures, or other College activities.

(Student Code of Conduct – Article 2, Section 9)

Use of Electronic Devices:

General: Taking photos or making audio/video recordings on Sault College property without permission in ANY context in which the person being photographed or recorded has a reasonable expectation of privacy is prohibited. Examples include but are not limited to:

Classrooms: The use of cell phones, photographically capable cell phones, pagers and other communication/electronic devices during classes, clinical or field placement is prohibited unless authorized by faculty.

Examinations: The use of cell phones, photographically capable cell phones, pagers and other communication/electronic devices during exams and midterms is prohibited unless authorized by faculty in charge.

(Student Code of Conduct – Article 2, Section 31)

SANCTIONS

College staff may impose sanctions in accordance with their responsibilities. Sanctions, which are imposed, may become part of the student's official record and are removed one year and one term after the student's last academic activity at Sault College.

The College shall make sanctions concerning students' actions and offences occurring within or affecting people on Sault College owned or controlled property, including but not limited to Ray Lawson Hall Residence, Sault College Aviation Hangar, off-campus at a College-sponsored event, or when such actions or offences at a non-College event off-campus have a direct impact on students' on-campus. The College reserves the right to assess any sanction it may deem appropriate. A serious breach or continuation or a repetition of behaviour in violation of the Student Code of Conduct will be cause for further sanctions up to and including expulsion.

Sanctions for Academic Dishonesty may include the following:

1. A professor/instructor may assign a sanction as defined below, or make recommendations to the Dean for disposition of the matter. The professor/instructor may:
 - issue a verbal reprimand
 - make an assignment of a lower grade with explanation
 - require additional Academic assignments and issue a lower grade upon completion, to the maximum grade "C"
 - make an automatic assignment of a failing grade
 - recommend to the Dean, dismissal from the course with the assignment of a failing grade
 - recommend to the Dean, dismissal from the College for a definite or indefinite period of time with a failing grade.

2. If the student denies the allegation of academic dishonesty the student should discuss the matter with the Director of Student Services immediately. If the matter cannot be resolved the student should file an Academic Appeal within three (3) working days. The appeal would automatically move to Step Two – Academic Appeal.

(Student Code of Conduct – Article 4)

Testing Absence

If a student is unable to write a test for medical reasons on the date assigned, the following procedure is required:

- In the event of an emergency on the day of the test, the student may require documentation to support the absence and must telephone the College to identify the absence. The college has a 24 hour electronic voice mail system (759-2554) Ext. 2600.
- The student shall provide the Professor with advance notice preferably in writing or e-mail of his/her need to miss the test.
- The student may be required to document the absence at the discretion of the Professor.
- All decisions regarding whether tests shall be re-scheduled will be at the discretion of the Professor.
- The student is responsible to make arrangements, immediately upon their return to the College with their course Professor in order to make-up the missed test prior to the next scheduled class for the course in question.

VIII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam and/or portfolio.

XI. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.