

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



**SAULT  
COLLEGE**

**COURSE OUTLINE**

**COURSE TITLE:** CONSTRUCTION MATERIALS

**CODE NO. :** CON200 **SEMESTER:** THREE

**PROGRAM:** CIVIL ENGINEERING TECHNICIAN

**AUTHOR:** SAL IENCO

**DATE:** SEPTEMBER 2016 **PREVIOUS OUTLINE DATED:** SEPTEMBER 2015

**APPROVED:**  
*"Corey Meunier"*  
CHAIR

**TOTAL CREDITS:** FOUR

**PREREQUISITE(S):** NONE

**HOURS/WEEK:** FOUR

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**I. COURSE DESCRIPTION:**

Construction materials are the foundation for any type of construction project. They play an important role in all phases of a project.

As a technician your responsibility is to understand the behavior and performance of materials. In this course the materials studied and tested include aggregates, port land cement concretes and asphalt hot mixes.

Throughout this course, students will adhere to the applicable Ontario Occupational Health and Safety Act and Regulations for Construction Projects.

**II. LEARNING OUTCOME:**

1. Conduct material testing, analysis and inspection using accepted standards and practices.
2. Apply sound environmental practices and policies in civil engineering / construction projects.

**III. REQUIRED RESOURCES/TEXTS/MATERIALS:**

- Highway Materials, Soils, and Concretes  
Harold N. Atkins

**IV. 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%
Two tests of equal weight	<u>60%</u>
<b>TOTAL</b>	<b>100%</b>

Please note that laboratories and assignments have to be handed in on the due date. Late submittals receive only a maximum grade of 60%. However, assignments handed in later than one week will receive a grade of 0%.

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.	

If a faculty member determines that a student is at risk of not being successful in their academic pursuits and has exhausted all strategies available to faculty, student contact information may be confidentially provided to Student Services in an effort to offer even more assistance with options for success. Any student wishing to restrict the sharing of such information should make their wishes known to the coordinator or faculty member.

**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 may not be granted admission to the room.

Laboratories/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 laboratories/assignments (without documentation) will receive a maximum grade of C (60%).

**VII. COURSE OUTLINE ADDENDUM:**

The provisions contained in the addendum located in D2L and on the portal form part of this course outline.

**VIII. TOPIC OUTLINE**

<b>Outcome</b>	<b>Topic and Content</b>	<b>Reading</b>	<b>Week</b>
1,2	<b>1. Aggregates</b> <ul style="list-style-type: none"> <li>• Introduction – Material Testing</li> <li>• Understanding why the testing of aggregates is important (Real life examples of failures).</li> <li>• List of the types of soil and rock deposits used for aggregates in Ontario</li> <li>• Identify standards for sampling and testing aggregates and perform aggregate tests.</li> <li>• Describe the procedure for extracting representative samples of aggregates from conveyors, stockpiles trucks and pit faces.</li> <li>• Determine the size of sample required for any test to be performed on the aggregate.</li> <li>• Explain why we complete different tests and what they mean.</li> <li>• Perform or demonstrate standard tests such as Sieve analysis, grain size distribution, wash test, relative density and absorption (course and fine aggregate), flat and elongated test and the testing for organics.</li> </ul>	Chapter 2 & 4	1-5
1,2	<b>2. Review /Mid Term Test</b> <ul style="list-style-type: none"> <li>• Reviews for Midterm Test</li> <li>• Mid Term Test</li> </ul>	Chapter 2 & 4	6
1,2	<b>3. Portland Cement Concrete</b> <ul style="list-style-type: none"> <li>• Understanding why the testing of concrete is important (Real life examples of failures)</li> <li>• Describe the manufacture of Portland cements, the types produced and their uses in construction</li> <li>• Describe Portland cement concrete including the materials used, the hydration process, water/cement ratio, curing requirements, workability, air content, admixtures and criteria used to measure properties.</li> <li>• Recognize methods used to improve durability of Portland cement concrete when exposed to freeze thaw cycles, road deicing chemicals and other destructive environments.</li> <li>• Prepare a Portland cement concrete mix, sample and test for temperature, slump air content and density.</li> <li>• Cast compressive strength cylinders.</li> <li>• Complete compression testing of standard cured concrete including the capping, breaking, and recording, plotting and evaluating results.</li> <li>• Introduction of reinforcing bar (Real Life Examples of Failure</li> <li>• Review on how to inspect for reinforcing bar.</li> </ul>	Chapter 7	6-9

1,2	<b>4. Roofing Material</b>	<i>Handouts</i>	10
	<ul style="list-style-type: none"><li>• Different type of roofing materials</li><li>• Inspection of roofing materials.</li></ul>		
1,2	<b>5. Asphalt</b>	Chapter 6	11-13
	<ul style="list-style-type: none"><li>• Understanding why the testing of asphalt is important (Real life examples of failures).</li><li>• Sampling techniques used.</li><li>• Process used to produce asphalt cements.</li><li>• Identify the types and uses of asphalt cements.</li><li>• Identify required asphalt cement tests.</li><li>• Observe and record laboratory sample split test.</li><li>• Participate in testing asphalt briquettes.</li><li>• Participate in testing asphalt for air voids, density stability and asphalt cement content.</li><li>• Perform an inspection of the types of failures and their causes.</li></ul>		
1,2	<b>6. Environmental Considerations</b>	<i>Handouts</i>	14
	<ul style="list-style-type: none"><li>• How to reuse material in a proficient manner that will protect the environment and reduce costs.</li></ul>		
1,2	<b>7. Occupational Health and Safety Act and Regulations for Construction Projects</b>	<i>Handouts</i>	14
	<ul style="list-style-type: none"><li>• Review the rights and Responsibilities of workers.</li><li>• Review the ten parts of the Occupational Health and Safety Act</li><li>• Apply the occupational health and safety regulations to specific in laboratory and specific job sites and conditions.</li><li>• Apply the workplace hazardous materials information system in a testing laboratory setting.</li></ul>		
1,2	<b>8. Review/ Final Test, Week15</b>	Chapter 6, 7 & handouts	15
	<ul style="list-style-type: none"><li>• Reviews for Final Test</li><li>• Final Test</li></ul>		