



## COURSE OUTLINE: CON200 - CONST. MATERIALS I

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<b>Course Code: Title</b>	CON200: CONSTRUCTION MATERIALS I
<b>Program Number: Name</b>	4080: CIVIL ENG TECHNICIAN
<b>Department:</b>	CIVIL/CONSTRUCTION
<b>Academic Year:</b>	2022-2023
<b>Course Description:</b>	<p>Construction materials are the foundation for any type of construction project. They play an important role in all phases of a project.</p> <p>As a technician your responsibility is to understand the behavior and performance of materials. In this course the materials studied and tested include aggregates, Portland cement concretes and asphalt hot mixes.</p> <p>Throughout this course, students will conduct themselves in a safe, cooperative and responsible fashion.</p>
<b>Total Credits:</b>	4
<b>Hours/Week:</b>	4
<b>Total Hours:</b>	56
<b>Prerequisites:</b>	There are no pre-requisites for this course.
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>Substitutes:</b>	ARC133, CON100
<b>Vocational Learning Outcomes (VLO's) addressed in this course:</b>	<b>4080 - CIVIL ENG TECHNICIAN</b>
<b>Please refer to program web page for a complete listing of program outcomes where applicable.</b>	VLO 2 comply with workplace health and safety practices and procedures in accordance with current legislation and regulations.
	VLO 3 complete duties and assist in monitoring that work is performed in compliance with contractual obligations, applicable laws, standards, bylaws, codes and ethical practices in the civil engineering field.
	VLO 4 carry out sustainable practices in accordance with contract documents, industry standards and environmental legislative requirements.
	VLO 5 collaborate with the project team and communicate effectively with project stakeholders to support civil engineering projects.
	VLO 6 collect, process and interpret technical data to produce written and graphical project-related documents.
	VLO 7 use industry-specific electronic and digital technologies to support civil engineering projects.
	VLO 8 participate in the design and modeling phase of civil engineering projects by applying engineering concepts, basic technical mathematics and principles of science to the review and production of project plans.



	VLO 10 perform quality control testing and the monitoring of equipment, materials and methods involved in the implementation and completion of civil engineering projects.
<b>Essential Employability Skills (EES) addressed in this course:</b>	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.
	EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication.
	EES 3 Execute mathematical operations accurately.
	EES 4 Apply a systematic approach to solve problems.
	EES 5 Use a variety of thinking skills to anticipate and solve problems.
	EES 6 Locate, select, organize, and document information using appropriate technology and information systems.
	EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.
	EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.
	EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.
	EES 10 Manage the use of time and other resources to complete projects.
	EES 11 Take responsibility for ones own actions, decisions, and consequences.
<b>Course Evaluation:</b>	<p>Passing Grade: 50%, D</p> <p>A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.</p>
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	<p>Grade Definition Grade Point Equivalent</p> <p>A+ 90 - 100% 4.00 A 80 - 89% B 70 - 79% 3.00 C 60 - 69% 2.00 D 50 - 59% 1.00 F (Fail)49% and below 0.00</p> <p>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.</p> <p>Attendance Students are only allowed to miss three classes without documented explanation. One mark will be deducted from your overall grade for each undocumented explanation. The maximum deduction in overall grade is not to exceed 15%. Valid documented explanation include: -Medical reason -Family emergency -Child care issue</p>

-Transportation problem

The documented explanation has to be sent to me by e-mail no later than three days from the missed class. A doctor note, etc., is to be attached as a PDF file to your e-mail.

**Books and Required Resources:**

Materials For Civil And Construction Engineers by Michael S. Mamlouk/John P. Zaniewski  
Publisher: Pearson Edition: Fourth  
ISBN: 10: 0-13-611058-4

**Course Outcomes and Learning Objectives:**

<b>Course Outcome 1</b>	<b>Learning Objectives for Course Outcome 1</b>
Upon successful completion, the student will be able to: 1. Perform standard aggregate tests following prescribed CSA (Canadian Standards Association) ASTM (American Society for Testing and Materials) standards.	1.1 List and describe why the testing of aggregates is important (Real life examples of failures). 1.2 List the types of soil and rock deposits used for aggregates in Ontario. 1.3 Identify standards for sampling and testing aggregates and perform aggregate tests. 1.4 Describe the procedure for extracting representative samples of aggregates from conveyors, stockpiles trucks and pit faces. 1.5 Determine the size of sample required for any test to be performed on the aggregate. 1.6 Explain why we complete different aggregate tests and what they mean. 1.7 Perform or demonstrate standard tests such as sieve analysis, grain size distribution.
<b>Course Outcome 2</b>	<b>Learning Objectives for Course Outcome 2</b>
Upon successful completion, the student will be able to: 2. Design and test Portland cement concrete mixes to satisfy design criteria such as water/cement ratio, admixtures and trial batch procedures	2.1 List and describe why the testing of concrete is important (Real life examples of failures). 2.2 Describe the manufacture of Portland cements, the types produced and their uses in construction. 2.3 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. 2.4 Recognize methods used to improve durability of Portland cement concrete when exposed to freeze thaw cycles, road deicing chemicals and other destructive environments. 2.5 Prepare a Portland cement concrete mix, sample and test for temperature, slump air content and density. 2.6 Cast compressive strength cylinders. 2.7 Complete compression testing of standard cured concrete including the capping, breaking, and recording, plotting and evaluating results. 2.8 List and understand the use of reinforcing bar in concrete(Real Life Examples of Failure) 2.9 Review on how to inspect for reinforcing bar.
<b>Course Outcome 3</b>	<b>Learning Objectives for Course Outcome 3</b>
Upon successful completion, the student will be able to:	3.1 Understanding why the testing of asphalt is important (Real life examples of failures). 3.2 Sampling techniques used.



	3. Define and explain asphalt concrete mixes using the Marshall and Superpave methods	3.3 Process used to produce asphalt cements. 3.4 Identify the types and uses of asphalt cements. 3.5 Identify required asphalt cement tests. 3.6 Observe and record laboratory sample split test. 3.7 Participate in testing asphalt briquettes. 3.8 Participate in testing asphalt for air voids, density stability and asphalt cement content. 3.9 Perform an inspection of the types of road failures and their causes.
	<b>Course Outcome 4</b>	<b>Learning Objectives for Course Outcome 4</b>
	Upon successful completion, the student will be able to: 4. Identify sustainable practices as it relates to concrete and asphalt used in the construction industry.	4.1 Identify the principles of sustainable construction using recycled concrete and asphalt. 4.2 Identify how to minimize waste and use appropriate waste management techniques.
	<b>Course Outcome 5</b>	<b>Learning Objectives for Course Outcome 5</b>
	Upon successful completion, the student will be able to: 5. Use industry-specific electronic technologies to support the calculations for typical strength of materials problems	5.1 Calculate and graph the results of sieve analysis using an Excel spreadsheet. 5.2 Calculate the mass ingredients of water, cement, fine aggregate and coarse aggregate using appropriate shareware software.
	<b>Course Outcome 6</b>	<b>Learning Objectives for Course Outcome 6</b>
Upon successful completion, the student will be able to: 6. Comply with health and safety practices and procedures while working in the laboratory.	6.1 Review the rights and Responsibilities of workers. 6.2 Review the ten parts of the Occupational Health and Safety Act. 6.3 Apply the occupational health and safety regulations to specific in laboratory and specific job sites and conditions. 6.4 Apply the workplace hazardous materials information system in a testing laboratory setting. 6.5 Conduct self in safe manner and in accordance with the requirements of work situation 6.6 Identify unsafe situations in the laboratory and take corrective actions	

**Evaluation Process and Grading System:**

Evaluation Type	Evaluation Weight
Final Exam	20%
Mid-Term Exam	20%
Quizzes/Assignments/Laboratories	60%

**Date:** January 9, 2023

**Addendum:** Please refer to the course outline addendum on the Learning Management System for further



 information.

