STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
CMGT 381 – Construction Materials Laboratory

Created by: Adrienne Rygel

Updated by:

Canino School of Engineering Technology

Department: Civil and Construction Technology

Semester/Year: Fall 2020

A. **TITLE**: Construction Materials Laboratory

B. **COURSE NUMBER:** CMGT 381

C. **CREDIT HOURS: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)**

 # Credit Hours: 1
 # Lecture Hours: 3 **per week**
 # Lab Hours: **per week**
Other: **per week**

Course Length: 15 **Weeks**

D. **WRITING INTENSIVE COURSE**: Yes ☐ No ☒

E. **GER CATEGORY: None:** ☒ **Yes:** GER
***If course satisfies more than one*:** GER

F. **SEMESTER(S) OFFERED: Fall** ☒ **Spring** ☐ **Fall & Spring** ☐

G. **COURSE DESCRIPTION:**

This laboratory course develops awareness with and expertise in conducting standardized field and laboratory tests on common civil engineering materials. The materials studied include aggregates and Portland cement concrete. Several concrete mix designs will be prepared and tested for fresh and hardened concrete properties. Students learn to analyze and interpret laboratory test data. If a student has obtained their ACI (American Concrete Institute) certifications in concrete field testing (Concrete Field Testing Technician - Grade I certification) and concrete laboratory testing (Concrete Lab Testing Technician -Level 1 certification and Concrete Strength Testing Technician certification), can provide formal certifications, and can receive content credit for this course.

H. **PRE-REQUISITES: None** ☐ **Yes** ☒ **If yes, list below:**

CMGT 380 Construction Materials; or permission of instructor

CO-REQUISITES: None ☐ **Yes** ☒ **If yes, list below:**

CMGT 380 Construction Materials

I. STUDENT LEARNING OUTCOMES: (*see key below*)

By the end of this course, the student will be able to:

Course Student Learning Outcome [SLO]	***Program Student Learning Outcome [PSLO]***	***GER*** *[If Applicable]*	***ISLO & SUBSETS***	
a) Conduct standard tests on aggregate (e.g. sieve analysis, unit weight, moisture content, specific gravity, absorption.	SO 5		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
b) Analyze and interpret results from aggregate tests.	SO 3 and 5		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
c) Discuss the impact of variations to concrete mix design (e.g. variable w:c, use of admixtures) on fresh concrete and hardened concrete properties.	SO 5		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
d) Conduct fresh concrete tests used for quality control (e.g. slump/spread test, unit weight, temperature, air content)	SO 5		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
e) Conduct hardened concrete tests and interpret test results (e.g. compressive and tensile strength tests).	SO 5		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
f) Effectively communicate through written (laboratory reports), oral (group lab presentation), and graphical communication (group lab poster, Excel graphs).	SO 1		1-Comm Skills ISLO ISLO	W Subsets Subsets Subsets
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KEY	**Institutional Student Learning Outcomes [ISLO 1 – 5]**
ISLO #	**ISLO & Subsets**
1	**Communication Skills** Oral [O], Written [W]
2	**Critical Thinking** *Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]*
3	**Foundational Skills** *Information Management [IM], Quantitative Lit,/Reasoning [QTR]*
4	**Social Responsibility** *Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]*
5	**Industry, Professional, Discipline Specific Knowledge and Skills**

*Include program objectives if applicable. Please consult with Program Coordinator

J. **APPLIED LEARNING COMPONENT:** Yes ☒ No ☐

If YES, select one or more of the following categories:

- ☒ Classroom/Lab
- ☐ Internship
- ☐ Clinical Placement
- ☐ Practicum
- ☐ Service Learning
- ☐ Community Service

- ☐ Civic Engagement
- ☐ Creative Works/Senior Project
- ☐ Research
- ☐ Entrepreneurship
  (program, class, project)

K. TEXTS:

Rygel, Adrienne. (2020). CGMT 381 Construction Materials Laboratory Manual. SUNY Canton.

L. REFERENCES:

Portland Cement Association Material Handbook

Mamlouk, Michael S. and Zaniewski, John P. (2017). Materials for Civil and Construction Engineers, 4th edition, Pearson Publishing.

M. EQUIPMENT: None ☒ Needed: Concrete mixing equipment and materials, compressive strength testing machine, flexural strength testing machine, calipers, unit weight buckets, slump testing equipment, concrete air content testing equipment, thermometers

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Laboratory Assignments, Written Report(s), and Oral Presentation(s)

P. DETAILED COURSE OUTLINE:

Q. LABORATORY OUTLINE: None ☐ Yes ☒

1. Sieve Analysis of Aggregates
2. Specific Gravity, Absorption, and Dry Unit Weight of Fine Aggregates
3. (a) Concrete mix 1 - Mix design, Water/cement ratio, Slump test, Unit weight test, Air content determination; (b) Making and curing concrete cylinders
4. (a) Specific Gravity, Absorption, and Dry Unit Weight of Coarse Aggregates; (b) Capping concrete cylinders and Compressive Strength of Concrete
5. Field Trip – Jefferson Concrete – Precast Concrete Plant
6. Concrete mix 2 – admixtures (e.g. effect of air entrainment, superplasticizers, fly ash, silica fume)
7. Flexural Strength of Concrete (beams)
8. Concrete mix 3 – design by ACI absolute volume method (hand calculations)
9. Field Trip – Barrett's Paving – Asphalt plant and testing lab
10. Concrete mix 3 – design by ACI absolute volume method (mixing, testing, and cylinders)
11. Concrete mix 4 – student design project for high strength concrete (research and design)
12. Concrete mix 4 – student design project for high strength concrete (mixing)
13. Concrete mix 4 - student design project for high strength concrete (poster presentation prep)
14. Concrete mix 4 – student design project for high strength concrete (group presentations and final breaks)