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

MASTER SYLLABUS

CIVL 213– Civil Engineering Materials

CIP Code: 14.0801

Created by: Adrienne C. Rygel
Updated by:

School: Canino School of Technology
Department: Civil and Construction Technology
Implementation Semester/Year: Fall 2026

A. TITLE: Civil Engineering Materials

B. COURSE NUMBER: CIVL 213

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

# Credit Hours per Week	**3**
# Lecture Hours per Week	**2**
# Lab Hours per Week	**3**
Other per Week	

D. WRITING INTENSIVE COURSE:

Yes	
No	x

E. GER CATEGORY:

Does course satisfy a GER category(ies)? If so, please select all that apply.

[1-2] Communication	
[3] Diversity: Equity, Inclusion & Social Justice	
[4] Mathematics & Quantitative Reasoning	
[5] Natural Science & Scientific Reasoning	
[6] Humanities	
[7] Social Sciences	
[8] Arts	
[9] US History & Civic Engagement	
[10] World History & Global Awareness	
[11] World Languages	

F. SEMESTER(S) OFFERED:

Fall	x
Spring	
Fall and Spring	

G. COURSE DESCRIPTION:

This course examines properties, common applications and methods for properly selecting the materials typically used in the constructed environment. The laboratory develops awareness with and expertise in conducting standardized field and laboratory tests on common civil engineering materials. The materials studied include aggregates, Portland cement concrete, masonry, and asphalt.

H. PRE-REQUISITES: ENGS 101 Introduction to Engineering, or permission of the instructor
CO-REQUISITES:

I. STUDENT LEARNING OUTCOMES:

Course Student Learning Outcome [SLO]	Program Student Learning Outcome [PSLO]	GER	ISLO & Subsets
a. Discuss the significant properties, preparation and applications of aggregate, concrete, asphalt and masonry in the constructed world.	SO7		ISLO 5
b. Conduct and interpret results from a sieve analysis.	SO6		ISLO 5
c. Determine the specific gravity, unit weight, moisture content, and absorption of fine and coarse aggregate.	SO6		ISLO 5
d. Prepare a mix design for concrete	SO7		ISLO 5
e. Perform slump, air content, temperature, and unit weight tests of freshly mixed concrete.	SO6		ISLO 5
f. Prepare and store concrete cylinders and beams for testing; and Conduct tests to evaluate the important properties of hardened concrete specimens.	SO6		ISLO 5
g. Discuss types, application, and testing associated with masonry units and hot asphalt in highway engineering.	SO7		ISLO 5
h. effectively communicate through written (laboratory reports), oral (group lab presentation), and graphical communication (group lab poster, Excel graphs).	SO3		ISLO 1 (O+W)

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**

J. APPLIED LEARNING COMPONENT:

Yes	x
No	

If yes, select [X] one or more of the following categories:

Classroom / Lab	x	Community Service	
Internship		Civic Engagement	
Clinical Practicum		Creative Works/Senior Project	
Practicum		Research	
Service Learning		Entrepreneurship [program, class, project]	

K. TEXTS:

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

L. REFERENCES: Portland Cement Association Material Handbook

M. EQUIPMENT: 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:

Exams
Homework Assignments
Laboratory Assignments

P. DETAILED COURSE OUTLINE:

I. Introduction
II. Aggregates
    A. Sources
    B. Geologic classification
    C. Uses
    D. Properties
    E. Handling

III. Portland Cement
    A. Production
    B. Chemistry
    C. Voids and properties in hydrated cement
    D. Types of cement

IV. Portland Cement Concrete
    A. Water
    B. Admixtures
    C. Proportioning mixes
    D. Mixing placing and handling
    E. Curing
    F. Properties of hardened concrete
    G. Testing of hardened concrete
    H. Modern alternatives and innovations

V. Masonry
    A. CMUS
    B. Clay bricks
    C. Mortar
    D. Grout
    E. Plaster

VI. Asphalt Binders and Mixtures
    A. Types and uses of Asphalt
    B. Thermal and chemical considerations
    C. Performance characterization
    D. Classifications of asphalt
    E. Asphalt concrete
    F. Mix Design
    G. Characterization
    H. Production
    I. Recycling
    J. Additives

Q. LABORATORY OUTLINE:

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