CIM 205 – Concrete Properties and Testing

COURSE NUMBER	CIM 205
COURSE DESCRIPTION	Concrete Properties and Testing
COURSE STRUCTURE	(2-2-3) (lecture hr/wk - lab hr/wk – course credits)
INSTRUCTOR	Dr. Mohab A. Hussein, PhD, PE, PMP, DBIA
COURSE DESCRIPTION	The principles of the design of concrete mix proportioning, concrete testing and aggregate testing using destructive and nondestructive techniques will be introduced and performed in this course.
PREREQUISITE(S)	None
COREQUISITE(S)	None
REQUIRED MATERIALS	CP-1 40th Edition: Technician Workbook for Concrete Field Testing Technician - Grade I CP-44: Technician Workbook for ACI Certification of Aggregate Laboratory Testing Technician—Level 1 8th Ed ACI PRC-211.1-22: Selecting Proportions for Normal-Density and High Density Concrete Guide Access to ASTM Compass (ASTM International Standards)
NATURE OF COURSE **COMPUTER USAGE**	Required Course Microsoft office (Word, Excel)
STUDENT LEARNING OUTCOMES (SLO)	By the end of the course students should be able to: 1. Define the chemical composition of cement, aggregates, and admixes and how they interact with one another. 2. Define the testing requirements of plastic/hardened concrete and aggregates. 3. Define the mining process of aggregates and raw materials used to make cement, as well as the history of cement. 4. Apply the proper testing requirements and technique of plastic and hardened concrete. 5. Apply the proper testing requirements for aggregates. 6. Apply industry standards/specifications towards concrete mix design and testing.
CLASS TOPICS	The effects of concrete-making materials (aggregates, cements, admixtures, etc.) on the properties of fresh and hardened concrete will be studied and analyzed from an applications point of view. Concrete mixture proportioning calculations, statistical analysis of strength tests, and the economics of various concrete mixes.
PROGRAM LEARNING OUTCOMES	The Student Learning Outcomes support the achievement of the following CIM Program Learning Outcomes OUTCOME 1 an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering/science problems appropriate to the discipline; (Relates to SLO 1-6) OUTCOME 3 an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature; (Relates to SLO 4-6)

OUTCOME 4 an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; (Relates to SLO 4-6)

OUTCOME 5 an ability to function effectively as a memer as well as a leader on technical teams; (Relates to SLO 4-6)

GRADING POLICY

Note: Grading Policy is subject to change by Instructor

Lab Reports	40 %
Assignments	5 %
Prelabs	12%
Quizzes	10%
Class Activities	15 %
Exams	12 %
Attendance	6 %

Letter grades will be assigned based on the following scale:

A	90 to 100
B+	85 to 89
B	80 to 84
C+	75 to 79
C	70 to 74
D	60 to 69
F	0 to 59

Note: A student cannot pass this course if:

1. You have failing grades on the tests and final exam.
2. You have not taken all tests and the final exam.

ACADEMIC INTEGRITY

NJIT has a zero-tolerance policy regarding cheating of any kind and student behavior that is disruptive to a learning environment. Any incidents will be immediately reported to the Dean of Students. In the cases the Honor Code violations are detected, the punishments range from a minimum of failure in the course plus disciplinary probation up to expulsion from NJIT with notations on students' permanent record. Avoid situations where honorable behavior could be misinterpreted. For more information on the honor code, go to http://www.njit.edu/academics/honorcode.php

Important Note about Using artificial intelligence (AI)

Student use of artificial intelligence (AI) is permitted in this course for certain assignments and activities. It is not permitted to be used in the assignments noted by the instructor, as doing so would undermine student learning and achievement of course learning outcomes. Additionally, if and when students use AI in this course, the AI must be cited as is shown within the NJIT Library AI citation page for AI. If you have any questions or concerns about AI technology use in this class, please reach out to your instructor prior to submitting any assignments.

STUDENT BEHAVIOR

- No eating or drinking is allowed at the lectures, recitation and workshops.
- Cellular phones must be turned off during the class hours – if you are expecting an emergency call, leave it on vibrate.
- No headphones can be worn in class.
- Unless the professor allows the use during lecture, laptops should be closed during lecture.

- Class time should be participative. You should try to be part of a discussion
- Students are required to sign a copy of the lab rules and procedures before being allowed to work on any equipment.

MODIFICATION TO COURSE The Course Outline may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified in class of any changes to the Course outline.

CLASS HOURS

Friday - Lecture 6:00 PM – 7:55 PM Central King Building (CKB) 214

Friday - Lab 8:05 PM - 10:05 PM Colten Hall (COLT) 121

OFFICE HOURS

Fenster Hall 444
by appointment: mohab.hussein@njit.edu

Course Outline

Wk	Date	**Discussion Topic** Tiernan Lecture Hall (TIER) 105	**Lab** Colten Hall (COLT) 121
1	9/5	Course Introduction & Overview	
2	9/12	Concrete Overview	NJIT EHS Cleaning Program
3	9/19	Concrete Testing	Lab Tour
4	9/26	Concrete Reinforcement	Lab Report
5	10/3	Cement and Supplementary Cementitious Materials	Lab Safety/ Lab Cleaning
6	10/10	Aggregates	Sieve Analysis of Fine and Coarse Aggregates
7	10/17	ACI 211- Mix Design	Density, Relative Density and Absorption of Coarse Aggregate
8	10/24	ACI 211- Mix Design	ACI 211- Mix Design Example
9	10/31	ACI Field Testing Technician Book Section 1: Sampling Fresh Concrete	Fresh Concrete Lab and Casting
10	11/7	ACI Field Testing Technician Book Section 2: Temperature of Fresh Concrete Section 3: Slump of Fresh Concrete Section 4: Density (Unit Weight) and Yield of Fresh Concrete	Compression Tests-7 Day
11	11/14	ACI Field Testing Technician Book Section 5: Air Content of Fresh Concrete- Pressure Method Section 6: Air Content of Fresh Concrete-Volumetric Method	Compression Tests-14 Day
12	11/21	ACI Field Testing Technician Book Section 7: Making and Curing Concrete Cylinders and Beams	Exam
13	11/28	Catch Up/ Review Day Agg & Mix Design	Splitting Tensile Strength Test
14	12/5	CLASS PRESENTATIONS / FINAL EXAM REVIEW / LAST CLASS BEFORE FINAL EXAM	
15	12/12	READING DAY – NO CLASS	
16	12/19	FINAL EXAM WEEK – CHECK FINAL EXAM SCHEDULES!	