

CIMT 205 – Concrete Properties and Testing

COURSE NUMBER	CIMT 205
COURSE DESCRIPTION	Concrete Properties and Testing
COURSE STRUCTURE	(1-2.5-3) (lecture hr/wk - lab hr/wk – course credits)
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 preformed in this course.
PREREQUISITE(S)	None
COREQUISITE(S)	None
REQUIRED MATERIALS	ACI Concrete Field Testing Technician Handbook ACI Aggregate Testing Technician Handbook PCA Handbook
NATURE OF COURSE	Required Course
COMPUTER USAGE	Microsoft office (Word, Excel)
COURSE LEARNING OUTCOMES	By the end of the course students should be able to: <ol style="list-style-type: none">1. Understand and apply the proper testing requirements and technique of plastic and hardened concrete.2. Understand and apply the proper testing requirements for aggregates.3. Be able to design and test concrete mix designs for a specific purpose utilizing ACI, PCA, ASTM, and AMRL specifications.4. Understand the mining process of aggregates and raw materials used to make cement, in addition to the history of cement.5. Understand the chemical composition of cement, aggregates, and admixes and how they interact with one another.
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.
STUDENT OUTCOMES	The Course Learning Outcomes support the achievement of the following CIMT Student Outcomes and TAC of ABET Criterion 9 requirements Student Outcome a - an ability to select and apply the knowledge, techniques, skills, and modern tools of their disciplines to broadly-defined engineering technology activities; Course Learning Outcome – Understand the ACI 211 design technique, in conjunction with job specific plans and specifications determine concrete mix proportioning. Student Outcome b - an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies; Course Learning Outcome – Design the most efficient mix proportion for economics while understanding the availability of raw materials and the environment. Student Outcome d - An ability to design systems, components or processes for broadly-defined engineering technology problems appropriate to program educational objectives; Course Learning Outcome - Design a concrete mix design that meets a standard set of

specifications, test the plastic and hardened concrete following the ACI guidelines and writing a detailed report based on the findings.

Student Outcome f - an ability to identify, analyze, and solve broadly-defined engineering technology problems;

Course Learning Outcome – Identify, test, and report on the most efficient concrete proportion design that can be used for various applications using aggregates in the lab.

Student Outcome g - an ability to communicate effectively regarding broadly-defined engineering technology activities;

Course Learning Outcome – Students work in lab groups collecting data and share technical information in which they will individually prepare professional caliber lab reports.

Student Outcome g - An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;

Course Learning Outcome - Students will be required to research various technical topics utilizing appropriate technical literature, and present at least 1 lab project related report to the class in a peer review setting.

Student Outcome k – A commitment to quality, timeliness and continuous improvement;

Course Learning Outcome - Students will complete on time and present materials in a professional manner.

Student Outcome l – Producing and utilizing design, construction and operations documents;

Course Learning Outcome - Students will review plans and specifications for a particular job and properly design a concrete mix that meets the project specifications.

Student Outcome n – Selecting appropriate construction materials and practices

Course Learning Outcome – Students will learn how to select and proportion aggregates, and admixes to achieve a specific need and how adjustments in proportions affect the overall product.

Student Outcome p - Applying basic technical concepts to the solution of construction problems involving hydraulics and hydrology, geotechnics, structures, construction scheduling and management and construction safety;

Course Learning Outcome – Employ various ACI, AMRL, OSHA, and ASTM specifications and techniques to safely determine concrete and aggregate material properties.

Student Outcome q – - Performing standard analysis and design in at least one technical specialty within construction engineering technology that is appropriate to the goals of the program;

Course Learning Outcome - Employ various ACI, AMRL, OSHA, and ASTM specifications and techniques to safely determine concrete and aggregate material properties, and determine if properties meet the requirements of the job specifications.

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GRADING POLICY

Reports	25 %
Exams and quizzes	35 %
Final Exam	30 %
Class Participation and lab Demeanor	10%

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>

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.

PREPARED BY

David M. Hawes

COURSE COORDINATED BY

Dr. Mohamed Mahgoub P.E.

CLASS HOURS**OFFICE HOURS**

The Instructor will be available 30 minutes before and after class. He does not have an official office however other arrangements can be made which would accommodate both parties. He is on campus multiple times a week. Please e-mail to request and coordinate at David.Hawes@njit.edu .