

CET 431 – CONSTRUCTION TESTING

COURSE NUMBER	CET 431	
COURSE DESCRIPTION	CONSTRUCTION TESTING	
COURSE STRUCTURE	(2-2-3) (lecture hr/wk - lab hr/wk – course credits)	
COURSE DESCRIPTION	Exposure to a variety of construction-related field tests and field testing equipment. Includes concrete mix design, concrete testing, asphalt tests, load testing of wood, mortar analysis and testing, brick testing, and quality control methods and procedures for finishes.	
PREREQUISITE(S)	Strength of Materials recommended	
COREQUISITE(S)	None	
REQUIRED MATERIALS	Basic Construction Materials, Latest Edition, by Theodore W. Marotta & Charles A. Herubim	
MANDATORY FIELD TRIP	TILCON INC. - QUARRY AND ASPHALT PLANT, MT. HOPE, N.J. s	
COURSE OBJECTIVES	<p>By the end of the course students should be able to:</p> <ol style="list-style-type: none"> 1. Producing and utilizing design, construction and operations documents 2. Performing standard analysis and design in at least one recognized technical specialty appropriate to the goals of the program 3. Selecting appropriate construction materials and practices 4. Applying Geotechniques and Structures 5. Write an effective laboratory report 6. Present orally technical information in a professional and concise manner. 7. Effectively interact with other team members to analyze materials and complete assignments. 8. Download and upload files with Moodle, as well as utilize other aspects of this learning management application 	
CLASS TOPICS	Aggregates (Soil Analysis), Concrete (Mix Design), Asphalt Testing and Production, Wood and Masonry Testing	
OUTCOMES	<p>The Course Learning Outcomes support the achievement of the following CET Program Outcomes and TAC of ABET Criterion 9 requirements</p> <p>Outcome 3 - an ability to conduct, analyze and interpret experiments, and apply experimental results to improve construction processes</p> <p>Outcome 5 -an ability to function effectively on teams</p> <p>Outcome 7 - an ability to communicate effectively</p>	
GRADING POLICY	Presentation/Papers/Field Trip Homework, Lab work, quizzes, and Class Participation Tests Attendance Final Exam	20% 20 % 20 % 15 % 25 %
Note: Grading Policy may be modified by Instructor for each Section in the Course)		

Note: Cannot pass course if you having failing grades on tests and final exam

Makeup examinations will not be given. Therefore, if any student has a valid reason for missing an exam, they should discuss with the instructor an alternate method of weighing the final grade.

The student is responsible for those materials covered in class and any materials assigned as readings as noted by instructor. A student who misses a class is still responsible for submitting materials in on time or they can give adequate notice of any late submittals to the professor before the due date.

All exams are cumulative unless otherwise noted by the instructor. All exams are closed book and closed notes. A formula sheet written by the student will be accepted in accordance with the instructor's limitations.

The final letter grade will be determined by the total number of points received during the course. Any variations to any of the above requirements are at sole discretion of the instructor.

HOMEWORKS AND REPORTS:

All reports are due one week after the last day of the lab, and all homeworks are due one week after it has been assigned. No homework or lab will be accepted one week after its due date or after it has been reviewed in class. All homeworks will be graded on the basis of the student attempt to understand the concept presented in the text or class. Reports must follow the outline or format as directed in class. **ABET course guidelines are in effect. Copy all of your work before submitting!!**

ATTENDANCE:

Attendance is absolutely mandatory!! Students are responsible for being sure they are recorded on the roster each day, and not at a later date. The Dean of Students requirements for attendance are applicable.

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, recitations, workshops, and laboratories.
- 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.
- During laboratory, if you are finished earlier, you must show the professor your work before you leave class
- Class time should be participative. You should try to be part of a discussion

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 PROGRAM COORDINATOR

Dr. D. Washington
Prof. John Wiggins

COURSE OUTLINE

Week	Date	Textbook	Assignment	Topics
1.	9-10	Read Chapter 1	Homework assignment in Moodle for week 1	Course Introduction And Overview/Pretest (Strength of Materials Review /Aggregates)
2.	9-17	Read Chapter 2	Homework assignment in Moodle for week 2	Notes on Strength and Materials and lab work begins for aggregate experiments (1 thru 6)
3.	9-24		Homework assignment in Moodle for week 3	Class Sample Problems on Sieve Analysis and aggregate lab work
4.	10-1			Homework review and aggregate experiments (1 thru 6)
5.	10-8			Test #1 Homework review and aggregate experiments (1 thru 6)
6.	10-15	Read Chapt. 4	Homework assignment in Moodle for week 6	Test #1 review and Concrete Mix Design
7.	10-22			Concrete Mix Design
8.	10-29	Read Chapt. 3	Optional Homework assignment in Moodle for week 8	Test #2 Concrete Mix Design
9.	11-5			Concrete Mix Design
10.	11-12			Asphalt Topics Begin
11.	11-19		Concrete Video Assignment	Concrete Testing/ Asphalt
12.	11-26			Asphalt Topics – Potential Date for Tour
13.	12-3			Wood and Masonry Lab
14.	12-10			Class Presentation of Term Project and extra credit -Final Review
15.	TBA			FOLLOW THE FINAL EXAM SCHEDULE

CLASS HOURS

Monday 6:00 PM – 9:05 PM FMH 408

OFFICE HOURS (GITC 2504)

Monday 5:00 PM – 6:00 PM

Or by appointment: (973) 642-7915 or washd@njit.edu

LABORATORY OUTLINE

Week	Date(s)	Descriptions/ Mini lecture	Lab #	Assignment
1-4	TBA	Lab 1 – AGGREGATE TESTING Bulk Density (Coarse Agg), Specific Gravity (Fine and Coarse Agg), Sieve Analysis(Fine and Coarse Agg),Moisture Content (Fine and Coarse Agg)	1	Fill out Lab Report with appropriate graphs and tables
6-11	TBA	Lab 2 – CONCRETE TESTING Bulk Density (Coarse Agg), Specific Gravity (Fine and Coarse Agg), Sieve Analysis(Fine and Coarse Agg),Moisture Content (Fine and Coarse Agg)	2	Fill out Lab Report with appropriate graphs
12	TBA	Lab3 - ASPHALT TESTING - Performed during Tilcon Tour	3	Lab Summary
13	TBA	Lab 4- Wood and Masonry Lab	4	TBA

PRESENTATIONS

During the last lab period, on week 15, you will be asked as a group, to give a 5-10 minute discussion on one of the topics listed below. A 5 page report **MUST** be submitted through turnitin.cm at the posted deadline. The paper will be double space with 1 inch margins. The powerpoint should be given to the professor through moodle after the class.

The report should include an introduction, description of the topic and relevant topics. It must also include at least five references, two of which is either a journal paper or a textbook. The written report should not be in overhead style (i.e. bulleted) but must be written as a regular report. The presentation must be in PowerPoint.

At the end of the laboratory for week six, you will need to tell me what topic will be chosen. While this is a group presentation, each person must participate in the presentation. **If you want to present another topic, you must get permission** by the end of the fifth week. If you do not choose a topic at this time, a topic will be assigned to the group.

Format to be used for group submissions of papers:

Cover Sheet

Table of Contents

Introduction or Overview

Various Sections and Headings

Conclusion (Tabulations of all selected materials,equipments, codes, etc)

Bibliography and References

Appendix

NOTES:

a. Each Group will choose one out of the seven options

b. Papers should be a minimum of five pages of type written text.

c.Groups will present their papers and projects to class at the designated class time.

d. Absolutely no late submissions.

a. Literature Search Paper

Go to the library and find references relating to the technology or testing of a building structure and write a brief synopsis about the :

Representative Material (RM) for this class which includes Asphalt, Masonry, Soil, Concrete and Wood. (i.e. Find a building of a wood/masonry/concrete frame structure in a magazine, periodical or book and mention some interesting facts about this structure pertaining to testing or technology.)

b. Find Web Sites that pertain to a particular technology or testing procedure for CET431's RM and write a paper as instructed. (i.e. Forensic Equipment in Masonry Structures)

c. Find a Web based program or any software that supports testing or placement of the RM. Write a paper about the software which may include a sample execution of the program. (i.e. Ghaly's mix design site)

d. Find a Field Project and do a write up on the technology and testing conducted on site.

Include field reports, specifications, and job descriptions, etc. (i.e. NJIT's new Masonry Dorm)

e. Find Codes and Specifications and do a comparison of testing equipment and procedures between these sources (i.e. Building code (ACI 318) vs Standard Spec (ACI 211), ASSHTO vs ASTM, etc.)

f. Create a demonstration model or experiment that explains physical properties discussed in class or that relate to testing materials. (i.e. Scale and Flask demos explaining specific gravity, exothermic process of concrete, etc.)

g. Create a skit(s) which demonstrates the anomalies that occur within a lab/lecture class that portrays how the human factor effects learning/teaching or practical hand-ons experiments.(i.e. miscommunications within groups or between student and teacher)

HOMEWORK AND LABS - IMPORTANT

Homework is **due the week following the date they are assigned (see syllabus), and must be given to the instructor.** The homework must show how you derived the answers – they will be graded either with a check, or a double check (exceptional). They will not count towards your final grade if **they are turned in more than one week late.** Homework must be handed in individually through moodle. Lab assignments are to be handed in as a team, rotating among each member. You must show on the front cover of the lab report who did what. Lab grades will be reduced by 10 points if one week late, and not graded if more than one week late.

NOTES REGARDING THE LABORATORY WORK

(1) The students will be divided, by the instructor, into groups. Group work will be done according to the section titled “Laboratory Procedures.” Groups may either be assigned for the entire semester.

(2) To be graded, **every lab report submitted must:**

- (a) be written using a word processing program
- (b) follow the format defined in the handout on webpage or moodle.
- (c) state clearly the responsibility of each group member.

GRADING OF LABORATORY REPORT

In grading a report, there are five areas that will be graded. The total of the points will be the grade for the lab report.

Item	Points
Completion of Lab	50
Technical accuracy	10
Grammar and Spelling	15
Discussion of Results and Conclusion	15
General appearance and following of format	10

The instructor may have groups correct each other's reports prior to handing in the final report. Grades will be given out for the report and the grading. Lab grades will be reduced by 10 points if one week late, and not graded if more than one week late. Labs are due the week after the scheduled completion date for that lab.

Laboratory Procedures

A group of students who meet at the assigned time and then start working on a lab project are not engaging in teamwork. Planning, assigning tasks, and assuming responsibility are all requirements of effective teamwork. A little extra work at the beginning of the project or experiment will pay for itself many times in terms of knowledge gained and accomplishing the given task.

Properly implemented teamwork will help the students develop skills in:

- pre-lab preparation
- working together as a group
- oral and written communications
- problem solving
- leadership.

Pre-lab preparation

Before a laboratory experiment is performed, you should have an idea of what the result might be. This insight could be as a result of theoretical predictions of the result, or by performing a computer simulation of the experiment. By understanding what the results should be, you can gain a better understanding of:

1. Why the experimental results might not be following the theoretical or computer simulation prediction.
2. What other changes in the experiment could be made to gain further insight into the main purpose of the experiment.

Pre-lab work will consist of readings in the chapter, looking up material in various handbooks.

Laboratory reports

Laboratory reports must be handed in at the beginning of the next laboratory (not necessarily the next week in cases of two or three week labs). Grading of the lab report will be based on the following criteria:

1. Neatness
2. Lab completed
3. Report format and style
4. Discussion
5. Proper use of terminology
6. Spelling/Grammar

The laboratory report should be based on results gathered in a lab handout downloaded from moodle.