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	Prerequisite: MET 237. Exposure to a variety of construction-related field tests and field testing equipment. Includes concrete mix design, concrete testing, soil density and compaction, asphalt tests, load testing of wood, mortar analysis and testing, brick and CMU testing, and quality control methods and procedures for finishes.
PREREQUISITE(S)	MET 237. Strength of Materials for Technology. 3 credits, 4 contact hours (2;2;0)
COREQUISITE(S)	None
REQUIRED MATERIALS	Basic Construction Materials, Latest Edition, by Theodore W. Marotta & Charles A. Herubim ASTM testing Procedures available at NJIT Library NJDOT Standard Specifications http://www.state.nj.us/transportation/eng/specs/2007/Division.shtml
MANDATORY FIELD TRIP	**Not - Applicable**
COURSE OBJECTIVES	By the end of the course students should be able to: 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 Canvas, 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, Steel
OUTCOMES	The Course Learning Outcomes support the achievement of the following CET Program Outcomes and TAC of ABET Criterion 3 requirements (2019-2020) Outcome 6 - an ability to conduct, analyze and interpret experiments, and apply experimental results to improve construction processes Outcome 5 -an ability to function effectively on teams Outcome 3 - an ability to communicate effectively

GRADING POLICY

Note: Grading Policy may be modified by Instructor for each Section in the Course)

Homework, Lab work, quizzes, and Class Participation	30 %
Tests	30 %
Attendance	15 %
Final Exam	25 %

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
Dr. D. Washington

PROGRAM COORDINATOR
Prof. John Wiggins

COURSE OUTLINE

Week	Date	Textbook	Assignment	Topics
1.	9-4, 9-6	Read Chapter 1	Homework assignment in Canvas for week 1	Course Introduction and Overview
2.	9-11,13	Read Chapter 2	Homework assignment in Canvas for week 2	Notes on Strength and Materials and lab related aggregate experiments (1 thru 6)
3.	9-18,20	Lab#1: Specific Gravity and Absorption of Coarse Aggregate (CA) – ASTM C127 Lab#2: Specific Gravity and Absorption of Fine Aggregate (FA) – ASTM C128 Lab#3:Unit Weight and Voids in Aggregate – ASTM C29,C127, C128 Lab#4: Moisture Content Aggregate-ASTM C566,C127, and C128 Lab#5: Sieve Analysis of Coarse Aggregate-ASTM C136 Lab#6: Sieve Analysis of Fine Aggregate-ASTM C136	Homework assignment in Canvas for week 3	Class Sample Problems on Sieve Analysis and aggregate lab work
4.	9-25,9-27	ASTM D6913 Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis		Homework review and aggregate experiments summary (1 thru 6)
5.	**10-02,** 10-04	ASTM D1140 Standard Test Methods for Determining the Amount of Material Finer than 75-μm (No. 200) Sieve in Soils by Washing		**Test #1**
6.	10-09, 10-11	ACI 211	Homework assignment in Canvas for week 6	Concrete Mix Design Related Testing and Problems

7.	10-16, 10-18	Compression Test of Concrete Cylinders ASTM C39,C192,C617 (performed at 7, 14 & 28 day), also includes all the ACI FL1 tests, temperature, slump, unit weight, pressure method for air content		Concrete Mix Design Related Test
8.	10-23, 10-25	ASTM A615 / A615M - 20 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement	Optional Homework assignment in Canvas for week 8	Structural Steel
9.	**10-30**, 11-01			**Test #2**
10.	11-06, 11-08	Perform basic welding utilizing stick and mig to show several types of welds such as fillet, gauge, etc. welds and show how to measure weld size and what to look for in a quality visual inspection		Structural Steel
11.	11-13 11-15	ASTM A615 / A615M - 20 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement	Concrete Video Assignment	Structural Steel
12.	11-20, 11-22	Adjustment for thickness, void ratio and possibly the price adjustment for oil and gas		Asphalt Thanksgiving – No Class (11/26)
13.	11-27, 11-29	Wood and Masonry Measurement of Compressive Strength of Wood Parallel to the Grain ASTM D143 Compressive Strength of Brick ASTM C67		Wood and Masonry (Wednesday Follows a Friday Schedule) November 29th – No Class
14.	12-4,12-6			Final Review
15.	TBA			FOLLOW THE FINAL EXAM SCHEDULE

CLASS HOURS

Wednesday	8:30 AM – 10:35 AM	COLT 422
Friday	2:30 PM -4:35 PM	KUPF 103

OFFICE HOURS (GITC 2504)

Wednesday,	By Appointment only
Friday	1:30PM – 2:30PM

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

HOME PAGE: **HTTP://WEB.NJIT.EDU/~WASHD/**

LABORATORY OUTLINE

Week	Date(s)	Descriptions/ Mini lecture	Lab #	Assignment
2-4	TBA	Lab 1 – AGGREGATE AND SOIL 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
6-8	TBA	Lab 2 – CONCRETE TESTING Compression Test of Concrete Cylinders ASTM C39,C192,C617 (performed at 7, 14 & 28 day), also includes all the ACI FL1 tests, temperature, slump, unit weight, pressure method for air content	2	Fill out Lab Report with appropriate graphs
10	TBA	Lab 3 – STRUCTURAL STEEL	3	Fill out Lab Report
11-12	TBA	Lab3 - ASPHALT Related Field Analysis	4	Lab Summary
13-14	TBA	Lab 4- Wood and Masonry Lab	5 & 6	Fill out Lab Report

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 Canvas. 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, e**very lab report submitted must**:

(a) be written using a word processing program
(b) follow the format defined in the handout on webpage or Canvas.
(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 Canvas.