

# CIVIL ENGINEERING MATERIALS

Course Syllabus and Outline – Fall 2008 – Course no: CEE- 08301

[http://users.rowan.edu/~mehta/cematerials\\_files/cematerials.htm](http://users.rowan.edu/~mehta/cematerials_files/cematerials.htm)

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**Required Text:** Mamlouk, M and Zaneiwski, J. Materials For Civil and Construction Engineers. Second Edition Addison Wesley, 2006.

**Class Times:** W 8.00 am to 9.15 am and R 8.00 to 10.40 am (304 Rowan Hall).

**Office Hours:** Tuesday and Thursday 3.00 pm to 4.00 pm.

## Grading

Laboratory reports (four)	30 %
Assigned paper and presentation (per group)	10 %
Two exams	15 %
Final exam (Comprehensive)	10 %
Homework and tutorials (four)	5 %
Quizzes (twelve)	30 %

**Accommodation:** Your academic success is important. If you have a documented disability that may have an impact upon your work in this class, please contact me. Students must provide documentation of their disability to the Academic Success Center in order to receive official University services and accommodations. The Academic Success Center can be reached at 856-256-4234. The Center is located on the 3rd floor of Savitz Hall. The staff is available to answer questions regarding accommodations or assist you in your pursuit of accommodations. We look forward to working with you to meet your learning goals

**Academic Integrity:** The University policy on academic integrity can be found at [http://www.rowan.edu/studentaffairs/deanstu/policies/academic\\_honesty/](http://www.rowan.edu/studentaffairs/deanstu/policies/academic_honesty/)

## Objectives

The objectives of the course are as follows:

1. Observe the physical behavior and significant mechanical properties of typical civil engineering materials subjected to external loads.
2. Gain experience in the operation of various laboratory test equipment and instrumentation.
3. Develop an appreciation of materials testing methods and procedures, and of the accuracy of test measurements.
4. Gain experience in the preparation of technical reports.
5. Develop interactive skills required in working as a member of a team.

A student will derive more benefit from this course in terms of comprehension, insight, experience and stimulation if he/she puts effort in the class. The students should attend all classes and laboratories. The laboratory reports and homework should be submitted on time using guidelines provided.

# OUTLINE

Month	Date	Day	Session	Class Topic	Reading
September	3	W	Class	Introduction	Chapter 1
	4	R	Class	Mechanical Properties- Variability	Chapter 1
	10	W	Class	Aggregates/Quiz 1	Chapter 5
	11	R	Class	Aggregates	Chapter 5
	17	W	Class	Aggregates /Quiz 2	Chapter 5
	18	R	<b>Lab I</b>	<b>Aggregates</b>	<b>Chapter 5 and Experiments 6, 7 and 9</b>
	24	W	Class	Cement/Quiz 3	Chapter 6
	25	R	Class	Cement	Chapter 6
October	1	W	Class	<b>Exam I - Aggregates</b>	
	2	R	Class	Cement	Chapter 6
	8	W	Class	PCC/Quiz 4	Chapter 5
	9	R	Class	PCC	Chapter 6
	15	W	Class	PCC/Quiz 5	Chapter 6
	16	R	<b>Lab II</b>	<b>PCC</b>	<b>Chapters 6 and 7 and Experiments 10 to 18</b>
	22	W	Class	Asphalt/Quiz 6	Chapter 7
	23	R	Class	Asphalt	Chapter 7
	29	W	Class	<b>Exam II Cement and PCC</b>	
30	R	Class	Asphalt	Chapter 9	
November	5	W	Class	Asphalt /Quiz 7	Chapter 9
	6	R	Class	Asphalt	Chapter 9
	12	W	Class	Asphalt Concrete /Quiz 8	Chapter 9
	13	R	Class	Asphalt Concrete	Chapter 9
	19	W	Class	Timber/Quiz 9	Chapter 10
	20	R	<b>Lab III</b>	<b>Asphalt Concrete</b>	<b>Chapter 9 and Experiments 23, 25, and 27</b>
	26	W	Class	Timber / Quiz 10	Chapter 10
	27	R	Thanksgiving – No classes		
December	3	W	Class	Timber/Quiz 11	Chapter 10
	4	R	<b>Lab IV</b>	<b>Timber</b>	<b>Chapter 10 and Experiment 29</b>
	10	W	Class	Timber /Quiz 12	
	11	R	Presentations		

# LABORATORY REPORTS

Upon completion of a laboratory exercise, each group must prepare a report describing the tests carried out in the exercise and the results obtained. Though only one report is required per group, it is strongly recommended that the division of work involved in performing the exercise and preparing the report be continually modified to provide each member with a balance of experience.

These reports will be short though formal in nature. They should contain sufficient detail such that a competent person can replicate the exercise using only the report itself, along with any referenced material, and obtain similar results. The following sections should be included in the report:

## 1. Title Page

The title page of the report must provide the following information:

- i. The number and name of course.
- ii. The number and title of the laboratory exercise.
- iii. The date the exercise was performed.
- iv. The date the report is submitted.
- v. The group number and names of students who carried out the exercise.
- vi. The name(s) of the student(s) preparing the report (only if different from above)

## 2. Introduction

A general statement concerning the tests or experiments performed and the objectives to be achieved by performing them. Also include a problem statement.

## 3. Theoretical Information/Literature

Provide relevant concepts and equations (without derivations) and previous work conducted on the topic. All equations should be numbered and references provided.

## 4. Materials

All materials and specimens are to be described in detail. This should include such information as the type, source and nature of the materials, and dimensions and conditions of specimens. Any other information that might affect the behavior of the materials under the given test conditions should be included.

## 5. Equipment

All major pieces of equipment (not to include small tools, containers, scoops, shovels, pans, etc.) used in the laboratory exercise should be listed in this section. Include the type, manufacture, and model of all testing equipment/ apparatus as well as the capacity and the accuracy of any measuring equipment.

## 6. Experimental Procedure

This section should include, or refer to, a description of the actual procedures used in the laboratory exercise. It is not necessary to describe these procedures in detail (it is sufficient to refer the laboratory manual/ or relevant standard). It is vital, that any departures from the cited procedures be fully detailed in the report.

## 7. Experimental Results

The results of all experimental test performed in the laboratory should be included in this section. Please include only RAW data. This information should be presented in suitable tables and graphs where applicable. Any qualitative observations made during the exercise should also be included.

## 8. Analysis

Present a detailed analysis of raw data with typical calculations and appropriate graphs. This includes typical calculations.

## **9. Discussion**

Discuss the significance and usefulness of the analysis, including comparisons with anticipated values where possible (e.g. typical material strengths/graded are readily available in many reference books). Include the probable accuracy of the results along with any sources of error or limitations of the experiment itself or the theory on which it is based.

## **10. Conclusions**

Explain the core idea or concept that you learned from the exercise. Do not confuse conclusions from discussion or results. A conclusion is a generality about the problem that can be deduced from the test results. What do the results tell you about the material you tested?

## **11. References**

Any previously published material that is referred to in the body of the report must be listed here in appropriate format (e.g. author, title, publisher, place, date and page numbers) in alphabetical order.

<http://pubs.asce.org/authors/book/generalresources/references.htm>.

## **12. Appendices(s)**

This section should contain any information that is relevant to the laboratory exercise but not essential to the sequential development of the report.

### **Format**

1. Reports should be typed or printed (12 point font). Hand written reports are unacceptable, though raw data, figures, diagrams, etc. can be included in such a format. Neatness and clarity is important and also expected.
2. Print on one side of the paper with one and a half space in text.
3. The figures and tables should be clear and legible and should bring across the point being made.
4. Include appropriate units everywhere necessary, include column headings in tables, axis labels on graphs and the values presented in the text. A numerical value with no unit indicates will be considered incorrect. The only exception to this rule is a measure that has no units (like strain), though many cases they can also be presented in percentages.
5. Use third person to explain a process.

### **Tables**

1. Number tables sequentially through out the report.
2. Each table should have a short title, which briefly summarizes the information presented in it. The title of each table must be unique and ABOVE the table.
3. Write out column headings in full, when possible, or abbreviate if necessary. Do not use symbols, even if they are conventional ones.
4. Units should be placed in column headings, not appended to every value in the table.

### **Figures/Graphs**

1. Number figures sequentially through out the report. (Graphs are usually considered to be figures). This numbering sequence should be separated from the table numbering sequence (i.e. it is possible to have a Table 2 and a Figure 2 in the same report)
2. Each figure should have a short title, which briefly summarizes the information presented in it. The title of each figure must be unique and BELOW the figure.
3. Legends or labels should be included in graphs to allow individual identification of multiple curves or bar series. These labels should be written out in full, when possible, or abbreviated if necessary. Do not use symbol alone, even if they are conventional ones.
4. The range of a graph axes should be adjusted, so that at least 80 % of the axis range is used. (e.g. for values between 30 and 50 a range of 20 to 60 would be more reasonable).
5. Data points or calculated points should be clearly indicated on curves.