

CE 201: Engineering Materials

Core course, 3.0 cr. hr.

CE 201: Engineering Materials

COURSE BINDER

ABET EC 2000

Instructors

Dr. Eqramul Haque (1 cr. hr.)

Dr. Abdul Jabbar Khan (1 cr. hr.)

Dr. Md. Jahangir Alam (1 cr. hr.)

Monday – 8am (Sec B) and 10am (Sec C),

Tuesday – 10am (Sec A)



ABET, incorporated as the

Accreditation Board for Engineering and Technology, Inc.,

is a non-governmental organization that accredits post-secondary education programs in "applied science, computing, engineering, and engineering technology".

The accreditation of these programs occurs mainly in the United States but also internationally. As of October 2011, around **3,100** programs are accredited, distributed over more than **660** universities and colleges in **23** countries.

Source: Wikipedia (<http://www.wikipedia.org/>)

Course: CE 201: Engineering Material (3:3, 0) - Core Course

Prerequisite: None

Course Description (2009 Catalog data):

Properties and uses of **aggregates**, brick, cement; sand, lime, mortars; **concrete**; **concrete mix design**;

wood structures and properties; shrinkage and seasoning; treatment and durability; mechanical properties; wood products;

advanced fiber reinforced polymer (FRP) composites and its application to civil engineering; reinforcement types, basic property of FRP composites and available FRP composite products;

definition of stress and strain; plane stress and strain condition; identification of strain components of elastic, elasto-plastic and elasto-visco-plastic materials; time dependent strain response of these materials due to different types of loadings; mathematical and simple rheological modeling for prediction of creep behavior;

ferrocement: advantages and uses;

corrosion and prevention of steel in RC structures, offshore structures and ground applications.

Course Topics and Their Duration (1 credit hour of CE 201):

Serial no.	Course topics	Number of lectures
1	Aggregates – type, gradation and fineness modulus	2
2	Concrete – workability, strength, durability, testing and quality control	4
3	Mix design of concrete and adjustment of batch	5
4	FRP and CRP	1
5	Timber	2
	Total =	14



Textbook(s):

1. *Concrete Technology*, A. M. Neville and J. J. Brooks.
2. *A Text Book of Engineering Materials*, M. A. Aziz.

Reference(s):

1. *Properties of Concrete*, A. M. Neville

Course Learning Objectives (CLO):

After successful completion of the course, the students should be able to:

- *Recognize* the importance of engineering materials as it relates to quality control of any civil engineering
- *Describe* the properties civil engineering materials such as concrete, cement, brick, FRP, ferrocement, aggregates etc.
- *Design* a concrete mix proportion for required compressive strength and workability.
- *Understand* the factors affecting the compressive strength of concrete.
- *Identify* the factors affecting the workability of fresh concrete.
- *Apply* the knowledge for the quality control of civil engineering construction.
- *Define* different terms used in civil engineering materials.

Class Test by

Dr. Eqramul Haque (1 cr. hr.) - 1

Dr. Abdul Jabbar Khan (1 cr. hr.) - 1

Dr. Md. Jahangir Alam (1 cr. hr.) - 2

Mark Distribution:

Attendance = 10%

Class Test = 20%

Final Exam = 70%

Class Schedule:

- One 1-hour session per week (Section A, B and C), **Monday – 8am (Sec B) and 10am (Sec C), Tuesday – 10am (Sec A)**

Office Hours: Sat and Mon, 12:00 – 1:00 PM

Course Contribution to Professional Component:

- Engineering Science: 80%
- Engineering Design: 20%

Course Relationship to Program Outcomes:

- (a) An ability to apply knowledge of mathematics, science and engineering
- (c) An ability to design a system, component, or process to meet desired needs
- (e) An ability to identify, formulate and solve engineering problems

Program Outcomes	ABET Outcomes										
	a**	b	c	d	e	f	g	h	i	J	k
Highest Attainable level of Learning *	1		2		2						

**key outcome

- 1 : Knowledge or Comprehension (Low);
- 2 : Application or Analysis (Medium);
- 3 : Synthesis or Evaluation (High)

Course Calendar

Course: CE 201 – Engineering Materials

Week No.	Topic	Homework No.	Quiz No.
1	Aggregates – type and gradation		
2	Aggregates – gradation and fineness modulus	1	
3	Concrete – factors affecting strength		
4	Concrete – workability and slump test		1
5	Concrete – factors affecting durability		
6	Concrete – testing and quality control		
7	Mix design of concrete - theory		
8	Mix design of concrete – example	2	
9	Mix design of concrete – example		2
10	Mix design of concrete – adjustment	3	
11	Mix design of concrete - adjustment		
12	FRP and CRP		
13	Timber		
14	Timber		

Course Instructional Methods and Assessment Tools:

Instructional methods to be used in the course according to the course activities are:

1. Lecture Notes:

Student will take notes during the lectures that fulfill the Course Learning Outcomes (CLO).

2. Text book:

Student will read the topics assigned related to the CLO in the text book.

3. Problem solving in the class:

Some problems will be solved by students in the class with the assistance of course teacher.

Indirect Assessment Tools:

Indirect assessment tools include the following survey questionnaires. Survey will be conducted among the students at the end of the semester.

1. Student Course Evaluation Survey
2. Survey of Students' Skills
3. Survey of Course Learning Objectives
4. Survey of Instructional Tools
5. Survey of Program Outcomes

The Course Evaluation Survey form also includes, in addition to the listed course attributes, some open ended questions as follows:

- What are the subject matters that they liked most
- What are the positive aspects of this course
- What needs to be done to improve the course, if necessary

Direct **A**ssessment **T**ools that will be used to assess the students' learning outcomes are:

1. **Homework:** three (3) sets of homework problems will be assigned to the students during the whole semester.
2. **Quizzes:** two (2) quizzes will be held during the semester.
3. **Final Examination:** There will be a final examination at the end of the semester.

Mapping of Course Learning Objectives (CLOs) into Program Outcomes:

CLO - PO Matrix

ABET EC2k Criterion 3: Program Outcomes and Assessment	a	b	c	d	e	f	g	h	i	j	k
CLO 1	1										
CLO 2	1										
CLO 3			2		2						
CLO 4	1										
CLO 5	1										
CLO 6			2		2						
CLO 7	1										
CE 201	1		2		2						