



20 Course Specification of Building **Materials**

I. Course Identification and General Information:					
1.	Course Title:	Building <i>Materials</i>			
2.	Course Code & Number:	CE 103			
3.	Credit hours:	C.H			
		Th.	Tu.	Pr.	Tr.
		2	2		
4.	Study level/ semester at which this course is offered:	2nd year level / 1st semester			
5.	Pre –requisite (if any):	Non			
6.	Co –requisite (if any):	Non			
7.	Program (s) in which the course is offered:	Civil Engineering			
8.	Language of teaching the course:	English+ Arabic			
9.	Study system	Semester			
10.	Location of teaching the course:	Class room			
11.	Prepared By:	Prof. Dr. Hassan Saad Abdulmoghni			
12.	Date of Approval				

II. Course Description:
<p>This course is designed to provide undergraduate civil engineering students with fundamental principles of the behavior, physical and engineering properties of various common civil engineering materials, including natural stones, sands, aggregates, cement, concrete and steel. Selection and design of materials based on their intended use in design and construction are emphasized. The laboratory sessions are designed to provide students with a hand-on experience on various material testing concepts and procedures. Written reports and oral presentation of experimental results will be required.</p>

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III. Course Intended learning outcomes (CILOs) of the course		Referenced PILOs
a.1	Achieve mastery of the fundamental knowledge and science of construction materials.	A1
a.2	Describe differences between construction materials and identify the characteristic of suitable materials for construction.	A2
a.3	Describe the procedures of laboratory tests of building materials and the relevant Standards.	A5
a.4	Demonstrate understanding of the physical and mechanical properties of construction materials	A5
b.1	Undertake lab experiments for determining the properties and the behavior of construction materials	B1
b.2	Choose suitable materials for construction	B1
b.3	Demonstrate understanding of the state-of-the-art concrete technology including analyze and design and produce concrete mixtures according to standards	B3
c.1	Evaluate the data obtained through standard laboratory testing procedures.	C1
c.2	Design and produce concrete mixes according to standards	C2
c.3	Using modern software to design concrete mixes	C3
d.1	Write the technical reports and making presentations	D1
d.2	Collaborate lab work in groups and divide responsibilities among group members	D3
d.3	Conduct and analyze laboratory tests for scientific research	D5

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(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a.1 Achieve mastery of the fundamental knowledge and science of construction materials	Lecture Directed self-study Student presentation Practical in Lab Site visit	Written exam Lab Reports Lab exam
a.2 Describe differences between construction materials and identify the characteristic of suitable materials for construction.	Lecture Directed self-study Student presentation Practical classes Lab	Written exam Lab Reports
a.3 Describe the procedures of laboratory tests of building materials	Lecture Directed self-study Student presentation Practical classes Lab	Written exam Written assignment Reports
a.4 Demonstrate understanding of the physical and mechanical properties of construction materials	Lecture Directed self-study Student presentation Practical classes Lab	Written exam Written assignment Reports

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(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b.1 Undertake lab experiments for determining the properties and the behavior of construction materials	Lecture Directed self-study Student presentation Practical classes	Written exam Written assignment Reports Lab exam
b.2 Choose suitable materials for construction	Lecture Directed self-study Student presentation Practical classes Site visit	Written exam Written assignment Reports
b.3 Demonstrate understanding of the state-of-the-art concrete technology including analyze and design and produce concrete mixtures according to standards.	Lecture Directed self-study Student presentation Practical classes	Written exam Written assignment Lab Reports Lab exam

(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c.1 Evaluate the data obtained through standard laboratory testing procedures.	Lecture Directed self-study Student presentation Practical classes Lab	Written exam Written assignment Reports Lab exam
c.2 Design and produce concrete mixtures according to standards	Lecture Directed self-study Student presentation Practical classes	Written exam Written assignment
c.3 Using modern software to design concrete mixes	Lecture Directed self-study	Written exam Written assignment Reports

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(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d.1 Write the technical reports and making presentations	Lecture lab Site visit Practical classes	Written exam Written assignment Lab Reports
d.2 Collaborate lab work in groups and divide responsibilities among group members	Lecture Directed self-study Student presentation Practical lab	Written exam Written assignment Lab Reports Lab exam
d.3 Conduct and analyze laboratory tests for scientific research	Lecture Directed self-study Student presentation Practical lab	Written exam Written assignment Reports Lab exam

IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Introduction	a.3,a.4, b.2 , a.2,a.1	introduction to traditional and new materials used in construction industry; Physical properties, Mechanical properties	1	2
2	Concrete aggregates	a.3,a.4, b.2 , a.2, b.3, b.1,a.1	Natural rocks; aggregate sources; geological classification; aggregate uses; types of aggregates and aggregates properties;	2	4
3	cement and water	a.3,a.4, b.2 , a.2, b.3 b1,a.1	Portland cement production; chemical composition of Portland cement; basic characteristics of Portland cements; types of	2	4

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			Portland cement; mixing water; water-cement ratio;		
4	Properties of Fresh Concrete	a.3,a.4, b.2 , a.2, b.3 b1,a.1	Workability; workability tests ; factors affecting workability; mixing placing and handling fresh concrete bleeding; segregation; curing concrete; admixtures for concrete;	2	4
5	Properties of Hardened Concrete	a.3,a.4, b.2 , a.2, b.3 b1,a.1,b2	compressive strength; factors influencing strength; deformation; permeability ;durability; shrinkage; non- destructive testing;	2	4
6	Design of Concrete Mixes	a.3,a.4, b.2 , a.2, b.3 b1,a.1,b2,c2,c 3	Proportioning of concrete mixes; introduction to mix design; factors affecting the Mix Design;	2	4
7	Steel	a.3,a.4, b.2 , a.2, b.3 b1,a.1,b2	Steel production; heat treatment of steel; structural steel; cold form steel; reinforcing steel; Steel fastening products; mechanical testing of steel; welding; steel corrosion	1	2
8	Bricks	a.3,a.4, b.2 , a.2, b.3 b1,a.1,b2	Introduction Types of bricks Properties of bricks	1	2
9	Natural rocks	a.3,a.4, b.2 , a.2, b.3 b1,a.1,b2	Introduction Types of rocks Properties of rocks	1	2
Number of Weeks /and Units Per Semester				14	28

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B - Tutorial Aspect:				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1	Introduction to construction materials lab; lab equipment and safety	1	2	a.3,a.4, b.2 , a.2, b.3 b.1
2	Sieve analysis of Aggregate, Specific Gravity of Aggregate, Unit Weight of Aggregate, Abrasion test of Aggregate	3	6	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3
3	Specific Gravity of Cement, Normal Consistency & Setting Time of Cement Past,	2	4	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3
4	Fresh concrete tests. , Workability tests	2	4	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3
5	Hardened properties of concrete (stress-strain diagram in compression, splitting, and flexural	2	4	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3
6	Mechanical properties of steel,	1	2	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3
7	Concrete Mix Design Exercise	3	6	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3,c2,c3
Number of Weeks /and Units Per Semester		14	28	

V. Teaching strategies of the course:
Lecture Directed self-study Student presentation Practical in Lab Site visit

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VI. Assignments:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Assignment 1	a.3,a.4, b.2 , a.2, b.3 b1,a.1	3	50%
2	Assignment 2	a.3,a.4, b.2 , a.2, b.3 b1,a.1,b2,c2,c3	10	50%

VII. Report:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Sieve analysis of Aggregate, Specific Gravity of Aggregate, Unit Weight of Aggregate, Abrasion test of Aggregate	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3	4	1
2	Specific Gravity of Cement, Normal Consistency & Setting Time of Cement Past,	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3	6	1
3	Fresh concrete tests. , Workability tests	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3	8	1
4	Hardened properties of concrete (stress-strain diagram in compression, splitting, and flexural	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3	10	1.5
5	Mechanical properties of steel,	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3	11	1.5
6	Concrete Mix Design Exercise	a.3, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3,c2,c3	14	1.5

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VIII. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Written assignment	3, 10	7.5	5	a.3,a.4, b.2 , a.2, b.3 b1,a.1,b2,c2,c3
2	Quizzes	Two times randomly	7.5	5	a.3,a.4, B.2 , a.2, b.3 B.1
3	Midterm Exam	9	15	10	a.3,a.4, b.2 , a.2, b.3 b1,a.1,b2,c2,c3
5	reports	4,6,8,10,11,14	15	10	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3,c2,c3
6	LAB exam	14	15	10	b2 , c.1, b.3 b.1, d.1, d.2, d.3,c2,c3
7	Final-exam	16	90	60	a.2.1, a.2.2 , a.5.1, b.1, b.3 c.1, d.1, d.2, d.3
Total			150%	100%	

IX. Learning Resources:	
<ul style="list-style-type: none"> Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher). 	
1- Required Textbook(s) (maximum two).	
	1. Michael S. Mamlouk and John P. Zaniewski (2011)*, Materials for Civil and Construction Engineers, 3rd Edition, Prentice Hall 2. A.M. Neville, Properties of Concrete, 5th Edition, Longman
2- Essential References.	
3- Electronic Materials and Web Sites etc.	
	- Non

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X. Course Policies:	
1.	Class Attendance: The students should have more than 75 % of attendance according to rules and regulations of the faculty.
2.	Tardy: The students should respect the timing of attending the lectures. They should attend within 10 minutes from starting of the lecture.
3.	Exam Attendance/Punctuality: The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for midterm exam and final exam.
4.	Assignments & Projects: The assignment is given to the students after each chapter, the student has to submit all the assignments for checking on time.
5.	Cheating: If any cheating occurred during the examination, the student is not allowed to continue and he/she has to face the examination committee for enquiries .
6.	Plagiarism: The student will be terminated from the Faculty, if one student attends the exam on another behalf according to the policy, rules and regulations of the university.
7.	Other policies: <ul style="list-style-type: none"> All the teaching materials should be kept out the examination hall. the mobile phone is not allowed. There should be a respect between the student and his teacher.

Reviewed By	<u>Vice Dean for Academic Affairs and Post Graduate Studies</u> <u>Dr. Tarek A. Barakat</u> <u>Dr. Ahmed Alwadhaf</u> <u>Dr. Mohammad Algorafi</u>
	<u>Deputy Rector for Academic Affairs Dr. Ibrahim AlMutaa</u> <u>Dr. Ahmed mujahed</u> <u>Dr. Munaser Alsubri</u>

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Course Plan (Syllabus) of Building Materials

I. Information about Faculty Member Responsible for the Course:						
Name of Faculty Member	Prof. Dr. Hassan Saad Abdulmoghni	Office Hours				
Location & Telephone No.	00967-777272335	SAT	SUN	MO N	TU E	WE D TH U
E-mail	hasmogni@yahoo.com				2	

II. Course Identification and General Information:					
1-	Course Title:	<i>Building Materials</i>			
2-	Course Number & Code:	CE103			
3-	Credit hours:	C.H			Credit Hours
		Th.	Tu.	Pr.	Tr.
		2	2		
4-	Study level/year at which this course is offered:	1st year level / 2nd semester			
5-	Pre –requisite (if any):	Non			
6-	Co –requisite (if any):	Non			
7-	Program (s) in which the course is offered	Civil engineering			
8-	Language of teaching the course:	English+ Arabic			
9-	System of Study:	Semester			
10-	Mode of delivery:	Lecture + practical			
11-	Location of teaching the course:	Class room Laboratory			

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III. Course Description:

This course is designed to provide undergraduate civil engineering students **with** fundamental principles of the behavior, physical and engineering properties of various common civil engineering materials, including natural stones, sands, aggregates, cement, concrete and steel. Selection and design of materials based on their intended use in design and construction are emphasized. The laboratory sessions are designed to provide students **with** a hand-on experience on various material testing concepts and procedures. Written reports and oral presentation of experimental results will be required..

IV. Intended learning outcomes (ILOs) of the course:

- Brief summary of the knowledge or skill the course is intended to develop:
 - a.1 Achieve mastery of the fundamental knowledge and science of construction materials. A1
 - a.2 Describe differences between construction materials and identify the characteristic of suitable materials for construction. A2
 - a.3 Describe the procedures of laboratory tests of building materials and the relevant Standards. A5
 - a.4 Demonstrate understanding of the physical and mechanical properties of construction materials A5
 - b.1 Undertake lab experiments for determining the properties and the behavior of construction materials B1
 - b.2 Choose suitable materials for construction B1
 - b.3 **Demonstrate** understanding of the state-of-the-art concrete technology including analyze and design and produce concrete mixtures according to standards B3
 - c.1 **Evaluate** the data obtained through standard laboratory testing procedures. C1
 - c.2 design and produce concrete mixes according to standards C2
 - c.3 Using modern software to design concrete mixes C3
 - d.1 Write the technical reports and making presentations D1
 - d.2 **Collaborate** lab work in groups and divide responsibilities among group members D3
 - d.3 Conduct and analyze laboratory tests for scientific research D5

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- **Distribution of Semester Weekly Plan of Course Topics/Items and Activities.**

Order	Topics List	Sub Topics List	Week Due	Contact Hours
1	Introduction	introduction to traditional and new materials used in construction industry; Physical properties, Mechanical properties	1	2
2	Concrete aggregates	Natural rocks; aggregate sources; geological classification; aggregate uses; types of aggregates and aggregates properties;	2,3	4
3	cement and water	Portland cement production; chemical composition of Portland cement; basic characteristics of Portland cements; types of Portland cement; mixing water; water-cement ratio;	4,5	4
4	Properties of Fresh Concrete	Workability; workability tests ; factors affecting workability; mixing placing and handling fresh concrete bleeding; segregation; curing concrete; admixtures for concrete;	6,7	4
5	Midterm Exam		8	2
6	Properties of Hardened Concrete	compressive strength; factors influencing strength; deformation; permeability ;durability; shrinkage; non-destructive testing;	9,10	4
7	Design of Concrete Mixes	Proportioning of concrete mixes; introduction to mix design; factors affecting the Mix Design;	11,12	4
8	Steel	Steel production; heat treatment of steel; structural steel; cold form steel; reinforcing steel; Steel fastening products; mechanical testing of steel; welding; steel corrosion	13	2
9	bricks	Introduction	14	2

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13.



		Types of bricks Properties of bricks		
10	Natural rocks	Introduction Types of rocks Properties of rocks	15	2
11	Final exam		16	2
Number of Weeks /and Units Per Semester			16	32

B - Tutorial Aspect:			
Order	Topics List	Week Due	Contact Hours
1	Introduction to construction materials lab; lab equipment and safety	1	2
2	Sieve analysis of Aggregate, Specific Gravity of Aggregate, Unit Weight of Aggregate, Abrasion test of Aggregate	2,3,4	6
3	Specific Gravity of Cement, Normal Consistency & Setting Time of Cement Past,	5,6	4
4	Fresh concrete tests. , Workability tests	7,8	4
6	Hardened properties of concrete (stress-strain diagram in compression, splitting, and flexural	9,10	4
7	Mechanical properties of steel,	11	2
8	Concrete Mix Design Exercise	12,13,14	6
Number of Weeks /and Units Per Semester		14	28

VI. Teaching strategies of the course:
Lecture Directed self-study Student presentation Practical classes Site visit

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VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Assignment 1	a1, a3,a4,b2, b3, c1, d2.1, d2.2	3	50%
2	Assignment 2	a1, a3,a4,b2, b3, c1, d2.1, d2.2	10	50%

III. Report:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Sieve analysis of Aggregate, Specific Gravity of Aggregate, Unit Weight of Aggregate, Abrasion test of Aggregate	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3	4	1
2	Specific Gravity of Cement, Normal Consistency & Setting Time of Cement Past,	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3	6	1
3	Fresh concrete tests. , Workability tests	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3	8	1
4	Hardened properties of concrete (stress-strain diagram in compression, splitting, and flexural	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3	10	1.5
5	Mechanical properties of steel,	a.3,a.4, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3	11	1.5
6	Concrete Mix Design Exercise	a.3, b2 , a.2, c.1, b.3 b.1, d.1, d.2, d.3,c2,c3	14	1.5

IX. Schedule of Assessment Tasks for Students During the Semester:

Assessment	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Written assignment	3, 10	7.5	5
2	Quizzes	Two times randomly	7.5	5
3	Midterm Exam	9	15	10
5	reports	4,6,8,10,11,14	15	10
6	LAB exam	14	15	10
Total			150	100%

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X. Learning Resources:	
• Written in the following order: (Author – Year of publication – Title – Edition – Place of publication – Publisher).	
1- Required Textbook(s) (maximum two).	
1. Michael S. Mamlouk and John P. Zaniewski (2011)*, Materials for Civil and Construction Engineers, 3 rd Edition, Prentice Hall 2. A.M. Neville, Properties of Concrete, 5 th Edition, Longman	
2- Essential References.	
3- Electronic Materials and Web Sites <i>etc.</i>	
- Non	

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XI. Course Policies:

Unless otherwise stated, the normal course administration policies and rules of the Faculty of ----- apply. For the policy, see: -----

1.	Class Attendance: The students should have more than 75 % of attendance according to rules and regulations of the faculty.
2.	Tardy: The students should respect the timing of attending the lectures. They should attend within 10 minutes from starting of the lecture.
3.	Exam Attendance/Punctuality: The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for midterm exam and final exam.
4.	Assignments & Projects: The assignment is given to the students after each chapter, the student has to submit all the assignments for checking on time.
5.	Cheating: If any cheating occurred during the examination, the student is not allowed to continue and he/she has to face the examination committee for enquiries .
6.	Plagiarism: The student will be terminated from the Faculty, if one student attends the exam on another behalf according to the policy, rules and regulations of the university.
7.	Other policies: <ul style="list-style-type: none"> • All the teaching materials should be kept out the examination hall. • the mobile phone is not allowed. • There should be a respect between the student and his teacher.

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