Philadelphia University

Faculty of Engineering
Department of Civil Engineering
First Semester 2025/2026

Course Information

Title:	**Construction Materials (0670214)**
Prerequisite:	Calculus II (0250102)
Credit Hours:	3 credit hours (16 weeks per semester, approximately 44 contact hours)
Textbook:	A. M. Neville, and J.J Brooks, Concrete Technology, Second Edition-2010, Prentice Hall
References:	A. M. Neville, **Properties of Concrete**, Fifth Edition-2011.
Course Description:	This course will provide an advanced understanding of cement chemistry, hydration reaction of Portland cement, chemical and physical interaction of aggregates and admixtures with the hydrated cement paste and their effects on the performance of fresh and hardened concrete. Concrete durability problems. Quality of water. Concrete mixing, handling, compacting, and curing of concrete. Testing of concrete. Concrete mix design.
Website:	http://www.philadelphia.edu.jo/academics/maldwaik
Instructor:	Dr. Mais Aldwaik **Email**: maldwaik@philadelphia.edu.jo **Office**: Engineering building, room 815, ext.: 2402 **Office hours**: Sat, Sun, Mon, Tues: 11:00-12:30
Technology Requirements	• Personal computer, laptop, or mobile phone. • Internet Connection. • Access to Philadelphia University E-Learning Portal (MS Teams and Moodle)
Learning Style	Online/Blended
Communication	• Announcement: the announcements will be posted in MS Teams or Moodle on a regular basis. • MS Teams or Moodle chats.
Class Recording	• All Synchronous lectures will be recorded and will be available on MS Teams.

Course Objectives:

This course aims to:

- understand concrete as a structural material.
- Recognize cement, aggregate, and water and their properties as basic constituents of concrete.
- Learn how to handle fresh concrete and how to evaluate its properties.
- Evaluate hardened concrete properties based on testing results.
- Perform concrete mix design.

Course Learning Outcomes (CLO) and Relation to ABET Student Outcomes

[1]	Develop an understanding of concrete as a structural material	1,2
[2]	Develop an understanding of cement types, manufacturing, properties, hydration, and testing	1,7
[3]	Analyze aggregate data and classify its types, mechanical and physical properties	2,6
[4]	Develop an understanding of quality of water and admixtures used in concrete production	2,7
[5]	Apply knowledge to decide best method for concrete mixing, handling, placing, and compacting	6,7
[6]	Perform concrete mix design	1,2,7

Grading Policy and Assessment Instruments

Evaluation of students' performance (final grade) will be based on the following categories

Graded Item	Marks	Topic (s)	Course LO (s)	Learning Portal: MS Teams/ Moodle/ F2F/Others	Week
Quiz 1	5%	Heat of Hydration	K1	F2F	3
Quiz 2	5%	Fresh concrete	K3	F2F	10
Report	10%	Extracurricular subject	S1	F2F	6
Homework	10%	Mix design	S2	Teams	14
Mid Exam	30%	Weeks 1-8	K1, K2	F2F	8
Final Exam	40%	Week 1-15	K2, S2	F2F	16
Total marks	100%				

- Two written exams will be given.
- Copying homework is forbidden, any student caught copying the homework or any part of the homework will receive zero marks for that homework.
- Quizzes: 10-minute quizzes will be given to the students during the semester. These quizzes will cover material discussed during the previous lecture(s).
- Homework: Problem sets will be given to students. Homework should be solved individually and submitted before the due date.
- The final exam will cover all the class material.

Course contents: Learning Resources/ References/ Activities/ Assessment Methods

Week	Lecture	Topic	CLO	Learning Resources/ References/ Activities/ Assessment Method	Learning Style	Learning Portal
					F2F/ Synchronous/ Asynchronous	On campus /MS Teams /Moodle /Others
1	1	Introduction	1	Text book	F2F	PPT in class
	2	Concrete as a structural material	1	Text book	F2F	PPT in class
	3	Concrete as a structural material	1	video	Asynchronous	Ms Teams
2	4	Cement; types	1	Text book	F2F	PPT in class
	5	Cement; manufacturing	1	Text book	F2F	PPT in class
	6	Cement manufacturing video		video	Asynchronous	Ms Teams
3	7	Cement; properties	1	Text book	F2F	PPT in class
	8	Cement; tests	6	Text book	F2F	PPT in class
	9	Cement testing video	1	video	Asynchronous	Ms Teams
4	10	Aggregates; classifications	1	Text book	F2F	PPT in class
	11	Aggregates; classifications	1	Text book	F2F	PPT in class
	12	Aggregate testing	6	video	Asynchronous	Ms Teams

5	13	Aggregates; mechanical properties.	1	Text book	F2F	PPT in class
	14	Aggregates; physical properties.	1	Text book	F2F	PPT in class
	15	Aggregate testing	6	video	Asynchronous	Ms Teams
6	16	Quality of water; mixing water, curing water	1	Text book	F2F	PPT in class
	17	Quality of water; mixing water, curing water, and tests.	1, 6	Text book	F2F	PPT in class
	18	Properties of water in construction video	1	video	Asynchronous	Ms Teams
7	19	Mixing, handling, placing, and compacting concrete.	1	Text book	F2F	PPT in class
	20	Mixing, handling, placing, and compacting concrete.	1	Text book	F2F	PPT in class
	21	Compacting video	1	video	Asynchronous	Ms Teams
8	22	Fresh concrete; workability, segregation, bleeding, and tests.	1	Text book	F2F	PPT in class
	23	Fresh concrete; workability, segregation, bleeding, and tests.	1, 6	Text book	F2F	PPT in class
	24	Fresh concrete issues video	1	video	Asynchronous	Ms Teams
9	25	Admixtures; air entraining, accelerators, set-accelerators	1	Text book	F2F	PPT in class
	26	Admixtures; set-retarders, and water-reducers.	1	Text book	F2F	PPT in class
	27	Admixtures video	1	video	Asynchronous	Ms Teams
10	28	Development of strength; curing	1	Text book	F2F	PPT in class
	29	Development of strength; influence of temperature and maturity.	1	Text book	F2F	PPT in class

	30	Long term strength video	1	video	Asynchronous	Ms Teams
11	31	Strength of concrete; compressive, tensile	1	Text book	F2F	PPT in class
	32	Strength of concrete; flexural, splitting, and tests.	1, 6	Text book	F2F	PPT in class
	33	Concrete testing	6	video	Asynchronous	Ms Teams
12	34	Fatigue and impact strength	1	Text book	F2F	PPT in class
	35	Resistance to abrasion, bond to reinforcement.	1	Text book	F2F	PPT in class
	36	Fatigue video	1	video	Asynchronous	Ms Teams
13	37	Elasticity	1	Text book	F2F	PPT in class
	38	Creep	1	Text book	F2F	PPT in class
	39	Creep in concrete	1	video	Asynchronous	Ms Teams
14	40	Concrete mix design.	2, 7	Text book	F2F	PPT in class
	41	Concrete mix design.	2, 7	Text book	F2F	PPT in class
	42	Mix design example	2, 7	video	Asynchronous	Ms Teams
15	43	Concrete mix design.	2, 7	Text book	F2F	PPT in class
	44	Concrete mix design.	2, 7	Text book	F2F	PPT in class

Credit hours contact

Credit Hours Distribution Report	
Learning Style	**Credit hours**
F2F	**30**
Synchronous	**---**
Asynchronous	**14**
Total	**44**

Academic Honesty/ student conduct

As a student at Philadelphia University, you are expected to follow the university regulations and guidelines for academic honesty/student conduct found in student handbook.

This means that you should not cheat, plagiarize and let another student use your account in LMS learning portals.

Attendance policy:

Absence from classes and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse, acceptable to and approved by the Dean of the relevant college/faculty, shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

October 2025