The Hashemite University
Faculty of Engineering
Civil Engineering Program
Course Syllabus

Course Title:	Prestressed Concrete	**Course Number:**	110401523
Department:	Civil Engineering	**Designation:**	Optional
Prerequisite(s):	110401422		
Instructor:	Dr. Abdullah Alghossoon	**Instructor's Office:**	You are welcome at any time
Instructor's e-mail:			
Office Hours:	To be announced later		
Time:	Sun, Tue, Thu (11:00–12:00)	**Class Rooms:**	E 2004

Course Description: Introduction to prestressed concrete, types and concepts of prestressed concrete, prestressing methods, types of concrete and prestressing steel, flexural analysis using elastic stresses, flexural strength analysis, and partial prestressing. Flexural design of beams, beams design with load balancing. Design based on strength requirements, flexural crack control, loss of prestressing force, composite beams

Textbook(s): Edward W. Nawy: "Prestressed Concrete – A Fundamental Approach." Prentice-Hall, 5th edition, 2010.

Other required materials: Building Code Requirements for Structural Concrete (ACI 318-19) and Commentary (ACI 318R-19), American Concrete Institute, Farmington Hills, Michigan.

Class/laboratory schedule: 3 class sessions each week; 60 minutes each

Topics covered:

1. Basic Concepts
2. Materials
3. Prestress Losses
4. Flexure stresses design
5. Ultimate strength design
6. Shear

Specific Outcomes of Instruction (Course Learning :Outcomes)

After completing the course, the student will be able to:

1. Identify the basic methods of fabricating prestressed concrete structures and how the fabrication method affects the design procedure and the structural behavior (1)
2. Calculate "equivalent" lateral loads due to prestressing and use them in the analysis and design of statically determinate prestressed concrete beams (1,2,6)
3. Calculate losses in a prestressed concrete member (1,2)
4. Design a statically determinate prestressed concrete beam for stresses in a serviceability limit state (1,2,6)
5. Check the capacity of prestressed concrete beams to resist ultimate bending moments and shear force (1,2);
6. Calculate stresses in a composite system with a precast prestressed concrete beam and a cast-in-place concrete slab at various stages of construction and service (1,2)
7. Using scientific programming tools such as Microsoft Excel and Mathcad to perform points (7).

:Student Outcomes (SO) Addressed by the Course

#	Outcome Description	Contribution
	General Engineering Student Outcomes	
.1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	H
.2	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	H
.3	an ability to communicate effectively with a range of audiences	L
.4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
.5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
.6	an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw a conclusion.	M
.7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	L
() Low, grades are in=**L** ,Medium =**M** ,High=**H**		

Grading Plan:	**Mid-term Exam**	**(30 Points)**	**TBA**
	HW	**(10 Points)**	**During the semester**
	Project	**(20 Points)**	**During the semester**
	Final Exam	**(40 Points)**	**Will be announced by the registrar**

General Notes:	Homework assignments will be assigned; however, will not be graded. You may work together on your homework, but your final product should be your individual work. Homework must be done on high-quality paper with neat sketches. Neatness will count, and messy unorganized problems will reduce credit and may require rework. When more than one page, homework should be stapled.