College of Engineering

Department of Civil Engineering

CE 575 Prestressed Concrete Structures

Credit and Contact hours	3/ 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Required for a MSCE degree
Course Description	Prestressing of statically indeterminate structures, prestressing losses; prestressed concrete slabs; partially prestressed concrete beams; members with unbonded tendons; coordination between design and construction techniques in prestressing. Relevant code provisions.
Prerequisites or Co-requisites	None
Course Learning Outcomes	Students completing this course successfully will be able to

Course Learning Outcomes	*Related Program Outcomes*
CLO1: Acquire the knowledge of various methods of prestressing	**K1**
CLO2: Analyze prestressed and partially prestressed continuous beams and indeterminate structures	**S1**
CLO3: Design prestressed and partially prestressed continuous beams and indeterminate structures	**C2**
CLO4: Design prestressed concrete two-way slabs and circular structures in accordance to the code specifications	**C2**
CLO5: Design prestressed concrete bridges in accordance to the code specifications using advanced computer programs	**C2**

Student Outcomes related to this Course	**K1**. Recognize advanced engineering knowledge, concepts and techniques to identify, interpret and analyze complex and real-life engineering problems.

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<tr><td></td><td>S1. Provide solution for complex and real-life engineering problems through critical thinking and using modern engineering tools and identify its impact on social and ethical issues.
C2. Design novel advanced Civil Engineering systems and evaluate its performance and effectiveness for engineering practice and its impact on society.</td></tr>
<tr><td>Topics Covered</td><td>
<table>
<tr><th>List of Topics</th><th>Related CLOs</th></tr>
<tr><td>1. Principle and Methods of Prestressing</td><td>CLO1</td></tr>
<tr><td>2. Prestressing Materials: Steel and Concrete</td><td>CLO1</td></tr>
<tr><td>3. Ultimate Strength Analysis and Design of Prestressed and Partially Prestressed Concrete Beams</td><td>CLO3</td></tr>
<tr><td>4. Shear Design of Prestressed and Partially Prestressed Concrete Beams</td><td>CLO3</td></tr>
<tr><td>5. Deflection Computation and Control in Prestressed Members</td><td>CLO2</td></tr>
<tr><td>6. Computation of Prestress Losses</td><td>CLO2</td></tr>
<tr><td>7. Continuous Beams and Indeterminate Structures</td><td>CLO3</td></tr>
<tr><td>8. Prestressed Concrete Slabs</td><td>CLO4</td></tr>
<tr><td>9. Circular Prestressed Concrete Structures</td><td>CLO4</td></tr>
<tr><td>10. Prestressed Concrete Bridges</td><td>CLO5</td></tr>
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<tr><td>Textbook(s) and Other Required Material</td><td>• Prestressed Concrete Analysis and Design: Fundamentals by Antoine E. Naaman. Techno Press; 3rd edition, 2012.
• Saudi Building Code for Concrete Structures - SBC304, 2018
• AASHTO LRFD Bridge Design Specifications, SI Units, 6th Edition, 2012</td></tr>
<tr><td>Grading System</td><td>Assignments 5%
Experimental Work and Report writing 5%
(in collaboration with Alrashid Abetong-Precast)
Seminar 5%
Project and Oral Presentation 15%
Midterm Exam 30%
Final Exam 40%</td></tr>
<tr><td>Instructors</td><td>Prof. M. Iqbal Khan –Office: 2A83, email: miqbal@ksu.edu.sa</td></tr>
<tr><td>Date of Review</td><td>February, 2021</td></tr>
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