



Lectures of the Department of Civil Engineering

Subject Title:- **Reinforce Concrete**

Class:-Third Class

Lecture Contents	Lecture sequences	First lecture	Instructor Name: Dr.mohammed
	<p>The major contents :</p> <p>1- Introduction and preliminaries.</p>		
	<p>The detailed contents:</p> <p>1- Introduction and preliminaries.</p> <p>2-Using reinforced concrete (Factors influencing concrete material, mechanical properties of concrete, and steel reinforcement).</p> <p>3-Method used to estimate the mechanical properties (compressive and tensile strength of concrete)</p> <p>4-Methods of design and requirements.</p>		

	Lecture sequences	Second lecture	Instructor Name: Dr.mohammed
Lecture Contents	The major contents : 1- Analysis using the working stress method.		
	The detailed contents: 1 Fundamental assumptions. 2-Stresses in reinforced concrete beam. 3-Analysis of rectangular Uncracked sections. 4-Analysis of rectangular beams in the working conditions. 5-Equilibrium method and method of transformed section 6-Analysis of cracked rectangular beam. 7-Analysis of T-beam. 8-Analysis of beams by the exact method. 9-Sections of special shapes.		

	Lecture sequences	third lecture	Instructor Name: Dr.mohammed
Lecture Contents	The major contents : 1- Analysis using the working stress method.		
	The detailed contents: 1 Fundamental assumptions. 2-Stresses in reinforced concrete beam. 3-Analysis of rectangular Uncracked sections. 4-Analysis of rectangular beams in the working conditions. 5-Equilibrium method and method of transformed section 6-Analysis of cracked rectangular beam. 7-Analysis of T-beam. 8-Analysis of beams by the exact method. 9-Sections of special shapes.		

	Lecture sequences	fourth lecture	Instructor Name: Dr.mohammed
Lecture Contents	The major contents : 1- Analysis using the working stress method.		
	The detailed contents: 1 Fundamental assumptions. 2-Stresses in reinforced concrete beam. 3-Analysis of rectangular Uncracked sections. 4-Analysis of rectangular beams in the working conditions. 5-Equilibrium method and method of transformed section 6-Analysis of cracked rectangular beam. 7-Analysis of T-beam. 8-Analysis of beams by the exact method. 9-Sections of special shapes.		

	Lecture sequences	forth lecture	Instructor Name: Dr.mohammed
Lecture Contents	The major contents : 1- Design using the working stress method.		
	The detailed contents: 1-Rectangular beam. Balanced section design. 2-Design of under reinforced concrete beam. 3-Design of over reinforced concrete beam. 4-Design of double reinforced concrete beam. 5-Design of T –section reinforced concrete beam 6-Design of one way reinforced concrete slabs. 7-Design of special shapes reinforced concrete beam.		

	Lecture sequences	fifth lecture	Instructor Name: Dr.mohammed
Lecture Contents	The major contents : 1- Design using the working stress method.		
	The detailed contents: 1-Rectangular beam. Balanced section design. 2-Design of under reinforced concrete beam. 3-Design of over reinforced concrete beam. 4-Design of double reinforced concrete beam. 5-Design of T –section reinforced concrete beam 6-Design of one way reinforced concrete slabs. 7-Design of special shapes reinforced concrete beam.		

	Lecture sequences	sixth lecture	Instructor Name: Dr.mohammed
Lecture Contents	The major contents : 1- Flexural strength of beams and one way slabs		
	The detailed contents: 1- Fundamental assumptions. 2-Equivalent rectangular stress block. 3-The balanced rectangular beam. 4-Maximum and minimum reinforcement ratios. 5-Analysis of singly reinforced rectangular sections. 6-Under reinforced beams. 7-Over reinforced beams. 8-Analysis of one way slabs. 9-Analysis of rectangular doubly reinforced beams. 10-Analysis of T- beams. 11-Analysis of special beam shapes.		

	Lecture sequences	seventh lecture	Instructor Name: Dr.mohammed
Lecture Contents	The major contents : 1- Flexural strength of beams and one way slabs		
	The detailed contents: 1- Fundamental assumptions. 2-Equivalent rectangular stress block. 3-The balanced rectangular beam. 4-Maximum and minimum reinforcement ratios. 5-Analysis of singly reinforced rectangular sections. 6-Under reinforced beams. 7-Over reinforced beams. 8-Analysis of one way slabs. 9-Analysis of rectangular doubly reinforced beams. 10-Analysis of T- beams. 11-Analysis of special beam shapes.		

	Lecture sequences	eighth lecture	Instructor Name: Dr.mohammed
Lecture Contents	The major contents : 1- Design by strength design method		
	The detailed contents: 1-Design of singly reinforced rectangular sections. <ul style="list-style-type: none"> ▪ Design of double reinforced rectangular sections. ▪ Design of T – beams. ▪ Design of special beam shapes. ▪ Reinforcing vertical faces for deep beams. 		

Lecture Contents	Lecture sequences	ninth lecture	Instructor Name: Dr.mohammed
	The major contents :		
	1- Beam design for shear.		
	The detailed contents:		
	1-Design of singly reinforced rectangular sections. <ul style="list-style-type: none"> ▪ Design of double reinforced rectangular sections. ▪ Design of T – beams. ▪ Design of special beam shapes. ▪ Reinforcing vertical faces for deep beams. 		

	Lecture sequences	tenth lecture	Instructor Name: Dr.mohammed
Lecture Contents	The major contents : 1- Beam design for shear.		
	The detailed contents: 1-Design of singly reinforced rectangular sections. <ul style="list-style-type: none"> ▪ Design of double reinforced rectangular sections. ▪ Design of T – beams. ▪ Design of special beam shapes. ▪ Reinforcing vertical faces for deep beams. 		

	Lecture sequences	eleventh lecture	Instructor Name: Dr.mohammed
Lecture Contents	The major contents : 1- Shear stresses in homogeneous beams.		
	The detailed contents: 1-Shear stresses in homogeneous beams. 2-Behavior of beams without shear reinforcement. 3-Transfer of shear forces in reinforced concrete beams. 4-Critical section for calculation of nominal shear strength. 5-Shear strength of beams without shear reinforcement. 6-axial forces. 7-Shear and axial torsion. 8-Beams of varying depth.		

	Lecture sequences	twelfth lecture	Instructor Name: Dr.mohammed
Lecture Contents	The major contents : 1- Shear stresses in homogeneous beams.		
	The detailed contents: 1-Shear stresses in homogeneous beams. 2-Behavior of beams without shear reinforcement. 3-Transfer of shear forces in reinforced concrete beams. 4-Critical section for calculation of nominal shear strength. 5-Shear strength of beams without shear reinforcement. 6-axial forces. 7-Shear and axial torsion. 8-Beams of varying depth.		

	Lecture sequences	thirteenth lecture	Instructor Name: Dr.mohammed
Lecture Contents	The major contents : 1- Beam design for torsion .		
	The detailed contents: 1-Torsional stresses in elastic homogeneous sections. 2-Torsional stiffness of homogeneous sections. 3-Effect of torsion stiffness on compatibility torsion. 4-Plastic torsional stresses in homogeneous sections. 5-Behavior of beams under combined loading. 6-Strength of sections under combined torsion and shear. 7-Torsional strength of concrete and web reinforcement according to ACI code. 8-Torsional strength of concrete. 9-Combined torsional and shear strength of concrete according to ACI code. 10-Torsional strength of web reinforcement. 11-Longitudinal reinforcement for torsion. Minimum limits for torsional reinforcement according to ACI code		

	Lecture sequences	fourteenth lecture	Instructor Name: Dr.mohammed
Lecture Contents	<p>The major contents :</p> <p>1- Analysis and design of short columns.</p> <p>.</p>		
	<p>The detailed contents:</p> <p>1- Behavior of axially loaded short columns.</p> <ul style="list-style-type: none"> ▪ Interaction of bending moment and axial loads. ▪ Nominal axial load capacity and ACI code maximum axial load capacity. ▪ Balanced strain condition for rectangular sections. ▪ Distributed reinforcement. ▪ Unsymmetrical reinforcement. ▪ Lateral ties and spiral reinforcement. ▪ Limits on reinforcement ratio. ▪ Analysis of section in compression control region (Equilibrium method, Whitney formula for compression failure, Straight line formula for compression failure). 		

Lecture Contents	Lecture sequences	fifteenth lecture	Instructor Name: Dr.mohammed
	<p>The major contents :</p> <p>1- Analysis and design of long columns.</p> <p>.</p>		
	<p>The detailed contents:</p> <p>1-Concentrically loaded columns.</p> <ul style="list-style-type: none"> ▪ Braced and unbraced frame. ▪ Effective length factor for columns. ▪ ACI procedure for classifying columns. ▪ Magnification of moment for slender columns. ▪ ACI method for moment magnification. ▪ Moment magnification for braced columns. ▪ Moment magnification for unbraced columns. ▪ Minimum eccentricity in design. 		

Lecture Contents	Lecture sequences	sixtieth lecture	Instructor Name: Dr.mohammed
	The major contents : 1- Development and splicing of reinforcement.		
	The detailed contents: 1- Anchorage or development bond. <ul style="list-style-type: none">▪ Flexural bond.▪ Determination of bond strength.▪ The nature of bond failure.▪ Reasons for not using flexural bond stresses in strength design.▪ Basic development length for tension reinforcement.▪ Modification factor for basic development length.▪ Critical sections for development of reinforcement.▪ Bundled bars.▪ Anchorages of torsion bars by hooks.▪ length for compression reinforcement.▪ Development of web reinforcement.		

	Lecture sequences	seventeenth lecture	Instructor Name: Dr.mohammed
Lecture Contents	The major contents : 1- Development and splicing of reinforcement. .		
	The detailed contents: 1- Anchorage or development bond. 2-Flexural bond. 3-Determination of bond strength. 4-The nature of bond failure. 5-Reasons for not using flexural bond stresses in strength design. 6-Basic development length for tension reinforcement.		