



Lectures of the Department of Civil Engineering

Subject Title:- **Reinforced Concrete Design**

Class:-Fourth Class

Lecture Contents	Lecture sequences	First lecture	Instructor Name: Dr.Suhib
	<p>The major contents :</p> <p>1- Design introduction of reinforced concrete structures</p>		
	<p>The detailed contents:</p> <p>1- Design of R.C. one way slabs and continuous beams</p> <ul style="list-style-type: none"> - Effective spans and deflection limits (minimum depth limits) - ACI code coefficient methods for moments and shear. - Design area of steel reinforcement and minimum area for shrinkage and temp. in slab and flexure for beams. - Beam loads and critical moment and shear sections in beams. - Detailing for reinforcement continuous beams and slabs. 		

Lecture Contents	Lecture sequences	Second lecture	Instructor Name: Dr.Suhib
	The major contents :		
	1- Design introduction of reinforced concrete structures		
Lecture Contents	The detailed contents:		
	1- Design of R.C. one way slabs and continuous beams <ul style="list-style-type: none"> - Effective spans and deflection limits (minimum depth limits) - ACI code coefficient methods for moments and shear. - Design area of steel reinforcement and minimum area for shrinkage and temp. in slab and flexure for beams. - Beam loads and critical moment and shear sections in beams. - Detailing for reinforcement continuous beams and slabs. 		

	Lecture sequences	Third lecture	Instructor Name: Dr.Suhib
Lecture Contents	The major contents : 1- Two way edge supported slabs		
	The detailed contents: 1- Minimum slab thickness. <ul style="list-style-type: none"> - Direct design method and limitations. - Total static moment (panel moment) - Middle and edge strip width and moment distribution. - Check for shear strength and flexure and calculation of steel reinforcement, checking minimum area and max spacing. - Design for beam supporting two way slabs. - Design by moment coefficient method. 		

	Lecture sequences	Fourth lecture	Instructor Name: Dr.Suhib
Lecture Contents	The major contents : 1- Two way edge supported slabs		
	The detailed contents: 1- Minimum slab thickness. <ul style="list-style-type: none"> - Direct design method and limitations. - Total static moment (panel moment) - Middle and edge strip width and moment distribution. - Check for shear strength and flexure and calculation of steel reinforcement, checking minimum area and max spacing. - Design for beam supporting two way slabs. - Design by moment coefficient method. 		

	Lecture sequences	Fifth lecture	Instructor Name: Dr.Suhib
Lecture Contents	The major contents : 1- Flat slabs and flat plates		
	The detailed contents: 1- Minimum thickness of beamless slab according to ACI code. <ul style="list-style-type: none"> - Effective span length and minimum drop panel dimension. - Check for punching shear strength and diagonal shear. - Application of direct design method. - Design of flexural reinforcement at all critical moment section. Check the minimum and maximum spacing. - Design by moment coefficient method. - Openings in flat slab construction . Detailing of reinforcing steel considering minimum extension bars lengths		

	Lecture sequences	Sixth lecture	Instructor Name: Dr.Suhib
Lecture Contents	The major contents : 1- Flat slabs and flat plates		
	The detailed contents: 1- Minimum thickness of beamless slab according to ACI code. <ul style="list-style-type: none"> - Effective span length and minimum drop panel dimension. - Check for punching shear strength and diagonal shear. - Application of direct design method. - Design of flexural reinforcement at all critical moment section. Check the minimum and maximum spacing. - Design by moment coefficient method. - Openings in flat slab construction . Detailing of reinforcing steel considering minimum extension bars lengths		

Lecture Contents	Lecture sequences	Seventh lecture	Instructor Name: Dr.Suhib
	The major contents : 1- One way ribbed slabs		
	The detailed contents: 1- Diagonal shear, solid part. <ul style="list-style-type: none"> - Design for steel reinforcements in ribs and topping slab. - Hollow block floor. Voided slabs, equivalent rib width		

Lecture Contents	Lecture sequences	eighth lecture	Instructor Name: Dr.Suhib
	<p>The major contents :</p> <ul style="list-style-type: none"> • 1- Design of reinforced concrete stairs 		
	<p>The detailed contents:</p> <p>1- Stair types and stair limitations.</p> <ul style="list-style-type: none"> - Design stairs mainly reinforcement in transverse direction. - Design stairs longitudinally reinforced. - Effective spans, loading and moment calculation. - Yield line theory of slab analysis - yielding slabs and development of plastic hinges. - Guide lines to established patterns of yield lines and axis of rotations slabs 		

Lecture Contents	Lecture sequences	ninth lecture	Instructor Name: Dr.Suhib
	The major contents : 1- Analysis by equilibrium method		
	The detailed contents: 1- Virtual work method. <ul style="list-style-type: none"> - Isotropically and orthotropically reinforced slabs. - Components of work methods. - Different types of loading. - Circular and polygon slab panels. - slabs with large opening. - Optimization method for load calculation. 		

	Lecture sequences	tenth lecture	Instructor Name: Dr.Suhib
Lecture Contents	The major contents : 1- Multistory building frames		
	The detailed contents: 1- Behavior of building frames under partial gravity loads. <ul style="list-style-type: none"> - Methods of maximum stress calculation in beams and columns of multistory building frame. - stresses produced from wind load. - computer programs used in analysis and deign of multistory. - Sub – frames analysis by ACI codes. 		

Lecture Contents	Lecture sequences	eleventh lecture	Instructor Name: Dr.Suhib
	The major contents : 1- Precast construction		
	The detailed contents: 1- Precast construction advantages and disadvantages. <ul style="list-style-type: none"> - Prefabricated elements, dimension limitations. - Types of joints connections. - Shear friction theory. - Design of brackets and corbels. - Design of precast beam end bearing. 		

Lecture Contents	Lecture sequences	twelfth lecture	Instructor Name: Dr.Suhib
	The major contents : 1- Design of reinforced concrete bridges		
	The detailed contents: 1- Type of loading used for bridges design. <ul style="list-style-type: none"> - Design of slab bridge and edge beam. - Deck girder bridges, span length, minimum depth, loading criteria. - Shear and flexural stress calculation at different sections along the span. - Design for deck reinforcement, girders flexural and diagonal reinforcement. - Design for exterior girders and intermediate diaphragms. 		

Lecture Contents	Lecture sequences	thirtieth lecture	Instructor Name: Dr.Suhib
	<p>The major contents :</p> <p>1- Prestressed Concrete</p>		
	<p>The detailed contents:</p> <p>1- The principles of prestressing, theory and method of load applying.</p> <ul style="list-style-type: none"> - Material properties and types, prestressed and ordinary steel high strength concrete. - Types and methods of prestressing. - Stress analysis at different load stages. - Principles limit stress at initial and after losses. - Cracking, cracking load and factor against cracking. - Ultimate strength of prestressed concrete and factor of safety. - Types of losses in prestressed concrete. - Lump sum estimation and detailed estimation of losses in prestressed concrete. • Reinforced concrete on ground water tanks <ul style="list-style-type: none"> - Circular water tanks. <p>- Design of rectangular water tanks</p>		

	Lecture sequences	fourteenth lecture	Instructor Name: Dr.Suhib
Lecture Contents	The major contents : 1- Prestressed Concrete		
	The detailed contents: 1- The principles of prestressing, theory and method of load applying. <ul style="list-style-type: none"> - Material properties and types, prestressed and ordinary steel high strength concrete. - Types and methods of prestressing. - Stress analysis at different load stages. - Principles limit stress at initial and after losses. - Cracking, cracking load and factor against cracking. - Ultimate strength of prestressed concrete and factor of safety. - Types of losses in prestressed concrete. - Lump sum estimation and detailed estimation of losses in prestressed concrete. • Reinforced concrete on ground water tanks <ul style="list-style-type: none"> - Circular water tanks. - Design of rectangular water tanks		