

<i>No.</i>	Information on Design of Reinforced Concrete Structures I	
1.	Unit Name: Design of Reinforced Concrete Structures I	
2.	Code: CE-51014	
3.	Classification: Engineering Subject	
4.	Credit Hour: 2.5	
5.	Semester and Year Tought:1/5	
6.	Pre- requisite (if any): CE-11022,CE12022, CE31013,&CE 32013	
7.	Method of Delivery: Lecture & Tutorial/ Assignment	
8.	Assessment System and Breakdown of Marks	
	Tutorial / Assignment	30%
	Final Examination	70%
	Total	100%
9.	Teaching Staff	
10.	<p>Objective of Unit:</p> <p>The main aim of this subject is to understand basic concept and. understanding of the behavior of reinforced concrete structures, calculate anchorage length, development length, deflection and cracks for reinforced concrete members and compute tension reinforcements, compression reinforcements , shear and diagonal reinforcements, torsion reinforcements for reinforced concrete members, slab reinforcements for edge supported slabs and retaining walls</p>	
11.	<p>Learning Outcome of Unit</p> <p>At the end of the unit, a student shall be able to:</p> <ol style="list-style-type: none"> <li>1. Describe basic concept and. understanding of the behavior of reinforced concrete structures</li> <li>2. Calculate anchorage length, development length, deflection and cracks for reinforced concrete members and retaining walls</li> <li>3. Compute tension reinforcements, compression reinforcements , shear and diagonal reinforcements, torsion reinforcements for reinforced concrete members and retaining walls, and slab reinforcements for edge supported slabs</li> </ol>	
12.	<p>Synopsis</p> <p>The unit intended to understand basic concept and. understanding of the behavior of reinforced concrete structures, calculate anchorage length, development length, deflection and cracks for reinforced concrete members and compute tension reinforcements, compression reinforcements , shear and diagonal reinforcements, torsion reinforcements for reinforced concrete members and slab reinforcements for edge supported slabs.</p>	

13.

### **Chapter 1. Introduction**

Concrete, reinforced concrete, prestressed concrete, structural forms, loads, serviceability, strength and structural safety, design basis, design codes and specifications, safety provisions of ACI code, fundamental assumptions for reinforced concrete behavior, behavior of members subjected to axial loads

### **Chapter 2. Materials**

Cement, aggregates, proportioning and mixing concrete, conveying, placing, and curing, quality control, admixtures, properties in compression and tension, strength in combined stress, shrinkage and temperature effects, high strength concrete, reinforcing steel for concrete, reinforcing bars, welded wire reinforcement, prestressing steels

### **Chapter 3. Flexural analysis and design of beams**

Bending of homogeneous beams, reinforced concrete beam behavior, design of tension reinforced rectangular beams, design aids, practical consideration in design of beams, rectangular beams with tension and compression reinforcement, t-beams

### **Chapter 4. Shear and Diagonal Tension in Beams**

Diagonal tension in homogeneous elastic beams, reinforcement concrete beams without shear reinforcement, reinforcement concrete beams with shear reinforcement, ACI code provision for shear design, effect of axial forces, beams with varying depth, alternative model for shear analysis and design, shear friction design method

### **Chapter 5. Bond Anchorage and Development Length**

Fundamental of flexural bond, bond strength and development length, ACI code provision for development of tension reinforcement, anchorage of tension bars by hooks, anchorage in tension using headed bars, anchorage requirement for web reinforcement, welded wire reinforcement, development bars in compression, bundled bars, bars cutoff and bend points in beams, structural integrity provisions, integrated beam design example, bar splices

### **Chapter 6. Serviceability**

Cracking in flexural members, ACI code provision for crack control, control of deflection, immediate deflection, deflection due to long-term loads, ACI code provision for control of deflections, deflection due to shrinkage and temperature changes, moment vs curvature of reinforced concrete sections

	<p><b>Chapter 7. Analysis and Design for Torsion</b></p> <p>Torsion in plain concrete members, torsion in reinforced concrete members, torsion plus shear, ACI code provision for torsion design</p> <p><b>Chapter 8. Analysis and Design of Slabs</b></p> <p>Types of slabs, design of one-way slabs, temperature and shrinkage reinforcement, behavior of Two-way edge supported slabs</p> <p><b>Chapter 17. Retaining Wall</b></p> <p>Function and Types of Retaining Wall, Earth Pressure, Earth Pressure for common Condition of Loading, External Stability, Design of A Gravity Retaining Wall, Basic Of Structural Design, Drainage And Other Details, Design of a Cantilever</p>
14.	<p>Main References:</p> <ol style="list-style-type: none"> <li>1. Arthur H. Nilson David Darwin Charles W. Dolan. Design of concrete Structures.(14<sup>th</sup> Edition)</li> <li>2. Structural Analysis by U Nyi Hla Nge</li> </ol>