



Course Weekly Outline

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Course name	Concrete technology			
Course objective	<p>This Module aims at helping students:</p> <ol style="list-style-type: none"> 1.To develop an understanding about the fundamentals of concrete technology. 2.To be aware of concrete historical development, general characteristics, types, and factors influencing Concrete properties. 3.To discuss and understand the materials involved in making Concrete. 4.Studying the concrete at its Fresh Stage including its design, estimation of material proportions as well as manufacturing, delivery, placing and curing. 5.Study the concrete at it Hardened stage including understanding concepts such as Shrinkage and Creep as well as Durability of concrete. 6.To understand the various laboratory tests required to be done for the concrete at various stages of its development. 			
Special Objectives	<p>By the end of this module, students should be able to exhibit the following key learning outcomes of this module:</p> <ol style="list-style-type: none"> 1. Recall key historical stages of concrete development over the centuries. Discuss and list concrete types, characteristics and factors influencing its properties. 2. Define and list the various types of cementitious binders. Explain the process of manufacturing Portland cement and its chemical composition. 3. Explain the hydration process of Portland cement and define Portland cement types. 4. Explain the effect of aggregate on concrete and classify the various types of aggregates. Discuss and explain the properties of aggregates. 5. Calculate the various moisture conditions of aggregate moisture content, fineness modules and Bulk specific gravity. Discuss the characteristics of water used in concrete. 6. Define the workability of fresh concrete and explain its method of measurement, segregation, bleeding and list the factors affecting workability of concrete. 7. Explain and carry out the relevant calculations for concrete mix design using both the American and British methods. 8. Discuss the manufacturing process of concrete and explain the key factors to be considered during the delivery and placing of concrete. 9. Discuss the Hardened stage of Concrete including explaining key topics such as strengths of Hardened Concrete, Dimensional Stability—Shrinkage and Creep, Durability as well as non-destructive tests. 			
References	<ol style="list-style-type: none"> 1. Advanced concrete technology by Zongjin Li. 2. Concrete technology by Dr. Moaid Nory 			
Course assessment	Lab.	Quizzes and assessment	Mid-term exam	Final exam
	10	30	10	50
General notes				



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Week No.	Theoretical	Experimental	Aims
1	Concrete Definition and Historical Development, Concrete as a Structural Material, Characteristics of Concrete, Types of Concrete and Factors Influencing Concrete Properties.		<p>This Module aims at helping students:</p> <ol style="list-style-type: none"> 1.To develop an understanding about the fundamentals of concrete technology. 2.To be aware of concrete historical development, general characteristics, types, and factors influencing Concrete properties. 3.To discuss and understand the materials involved in making Concrete. 4.Studying the concrete at its Fresh Stage including its design, estimation of material proportions as well as manufacturing, delivery, placing and curing. 5.Study the concrete at it Hardened stage including understanding concepts such as Shrinkage and Creep as well as Durability of concrete. 6.To understand the various laboratory tests required to be done for the concrete at various stages of its development.
2	Cementitious Binders: Classification of binders, Portland cement, Manufacture of Portland cement, Chemical composition, Hydration of Portland cement		
3	Cementitious Binders: Types of Portland cement, The role of water, Basic tests of Portland cement, Geopolymers		
4	Aggregates: Effects of aggregates, Classification of aggregates, Properties of aggregates, Moisture conditions, Moisture content (MC) calculations, Density and specific gravity, Unit weight,		
5	Measurement of moisture content, Grading aggregates, Shape and texture of aggregates. Solved examples for Moisture content (MC) calculations.		
6	Admixtures: Definition and classifications, Chemical admixtures, Air-entraining admixtures, Mineral admixtures.		
7	Water: Mixing water, Impurities in water, Water for curing and washing.		
8	Midterm Exam		
9	Workability of fresh concrete, Segregation and bleeding, slump loss.		
10	Introduction to Mix Design. Procedures For Concrete Mix Design using the American Institute of Concrete method		
11	Solved Examples for American method for concrete Mix design.		
12	Procedures For Concrete Mix Design using the British Standards Institute.		
13	Solved Examples for British method for concrete Mix design.		
14	Manufacture of Concrete. Delivery of Concrete.		
15	Concrete Placing: Site preparation, conveying concrete, Depositing concrete in forms, Compacting and finishing, Curing. Early-Age Properties of Concrete		