

4007 - CONCRETE TECHNOLOGY									
Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)				
Lectures	Practical	Credits			Theory		Practical Ex.	Total	
3	2	5	25	25	3Hrs.	100	0	150	
Pre-requisite		Source	Semester	Theory	Test	Total	TW	PR	Gr Total
Nil		CVL		75	25	100	25	-	125

RATIONALE: -Concrete is the most versatile construction material which can be moulded to any size and shape and possesses special characteristics of high compressive strength, durability, fire resistance, impermeability and homogeneity. It forms an ideal combination with steel for use in R.C.C structures. Concrete generally involves in-situ construction and the quality of concrete governs the performance of the resulting structure. Therefore the knowledge of theory and practice of good concrete making is of vital importance to a successful Civil Engineer.

COURSE CONTENTS	Hrs	Mks
1. INTRODUCTION	1	2
General idea of different types of concrete, lime concrete, cement concrete, R.C.C and pre-stressed concrete.		
2. CONCRETE	9	24
Cement- Outline of manufacturing process of Portland cement. Chemical composition, compounds of cement, fineness, hydration, setting and hardening, strength and hardness, Tests on cement- fineness, consistency, setting time, compressive strength, soundness. Requirements as per I. S. 269, storage of cement. Fine aggregate- Types, sieve analysis, fineness modulus, impurities, bulking of sand and its effects. Tests. Coarse aggregate- Types, sieve analysis, fineness modulus, grading of aggregates. Properties and tests. Water- Requirements of water suitable for concrete making.		
3. CONCRETE MAKING	6	12
Different grades of concrete as per IS456-1978. Proportioning of ingredients, volume batching, weight batching, water cement ratio, its importance. Yield of concrete per batch. Mixing of concrete- Object, types of mixing-hand, machine. Types of mixers, capacity, ready-mix concrete. Transporting and placing of concrete, various methods, precautions to be taken. Segregation, bleeding, concreting under water. Comparison of concrete- Object of compaction, hand compaction, use of vibrators, advantages, precautions to be taken. Curing of concrete- Purpose, methods of curing under different situations, steam curing and curing period.		
4. PROPERTIES OF CONCRETE	5	12
Workability- Necessity, factors affecting, measurement, test, method of improving workability. Strength- Crushing strength, factors affecting. Tests as per I. S. 516.		
5. ADMIXTURES	3	6
Necessity and factors, types of admixtures, their uses- accelerators, retarders. Air-entraining agents, pore fillers.		
6. JOINTS	5	8
Purpose, location and types, construction-joint, contraction and expansion joints. Types of surface finishes.		
7. SPECIAL TYPES OF CONCRETE	5	8
Salient properties, advantages and limitations of following types of concrete- Pre-cast concrete, pre-stressed concrete, ready-mix concrete, ferrocement concrete, light weight concrete, air-entrained concrete and fibre- reinforced concrete.		

8. FORM WORK	4	8
Purpose, requirements of form-work, types of form-work, removal of form work, minimum time and precautions.		
9. CONCRETE MIX DESIGN	6	12
Objectives of mix design, design methods, nominal mix and design mix both as per standards. Nominal mix design- I. S. 456 specifications for strength of concrete, principles of mix design, strength and workability requirements, determination of water- cement ratio, coarse and fine aggregate ratio, aggregate cement ratio, concrete mix proportioning, checking of cement factor, durability and trial- mix. Introduction to controlled concrete-design mix, design methods, different grades, estimating yield of concrete, concrete cement factor and water- cement ratio.		
10. NON-DESTRUCTIVE TESTS	4	8
Objectives, various methods- Rebound hammer, ultra-sonic.		
Total	48	100

TERMWORK

The term work shall consist of a journal based on laboratory work involving the following test. Fineness of cement. Standard consistency. Setting times-initial, final. Compression tests on cement mortar cubes. Soundness test (optional). Impurities in sand. Fineness modulus of aggregates. Bulking of sand. Aggregate crushing value. Aggregate impact value. Abrasion test. Compacting factor. Slump test. Compression test. Flow test (optional). Modulus of rupture test (optional).

REFERENCE BOOKS

1. Concrete Technology by Shetty M.S.
2. A Text book of Concrete Technology by Kulkarni P.D.
3. Concrete Technology by Handu & Puru
4. Laboratory Manual for Concrete Technology by Kulkarni P.D. & Mittal L.N.
5. Concrete Technology by D.F. Orchard.

(Signature)