DEPARTMENT OF CIVIL ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Course Title	CONCRETE TECHNOLOGY		
Course Code	AR204	**No. of Credits**	03
Course Code of Pre-requisite subject(s)	NIL		
Session	January 2018	**Section (if, applicable)**	
Name of Faculty	Dr. Jayachandran K.	**Department**	Civil Engineering
Email	jay@nitt.edu	**Telephone No.**	99526 09907
Name of Course Coordinator(s) (if, applicable)			
E-mail		**Telephone No.**	
Course Type	◙ Core course	☐ **Elective course**	

Syllabus (approved in BoS)

Introduction - classification of concrete mixes - Grades of concrete - Advantages and disadvantages of concrete. Concrete Making Materials - Cement-Method of Manufacturing of Cement - properties and specific uses of various types of cement. Test on cement - fineness - setting time - consistency - soundness - compressive strength.

General classification of aggregate - properties of aggregate - shape, texture, porosity and absorption, soundnesstest on aggregates. Grading of Aggregates. Water - Quality of Water for mixing and curing - use of sea water for mixing concrete.

Basic consideration - factors influencing mix proportion - Mix Design by ACI method and I.S. code method -Design of high strength concrete - test on concrete. Information on Admixtures Plasticizers.

Introduction - Batching of materials - Mixing of Concrete materials - Transportation of concrete - Placing of concrete - curing of Concrete. Properties of Concrete - Introduction - strength of Concrete - stress and strain characteristics of concrete. Thermal properties of concrete - Micro cracking of concrete- RMC.

Introduction - light weight concrete - Fibre reinforced concrete - Polymer composites concrete - Air entraining concrete - Ferrocement - sulphur concrete - Mass concrete - Guniting. Quality control in Concrete – Sampling and testing of concrete - Factors causing variations in the quality of concrete.

COURSE OBJECTIVES

1. To understand the properties of ingredients of concrete
2. To study the behavior of concrete at its fresh and hardened state
3. To study about the concrete design mix
4. To know about the procedures in transportation and concreting
5. To understand special concrete and their use

COURSE OUTCOMES (CO) (Refer student attendance book for the list of POs)	
Course Outcomes	**Aligned Programme Outcomes (PO)**
On completion of the course, the students will be able to:	
1. Students have learned the fundamentals of concrete and how the properties of concrete are affected by the different ingredients of concrete.	1,6,7,9,10
2. Design a concrete mix which fulfils the required properties for fresh and hardened concrete	3,4,5,6,11
3. Develop an awareness of the utilisation of waste materials as novel innovative materials for use in concrete	3,4,6,7,8,12
4. Identify the functional role of different and special concrete and apply this knowledge to enhance the architectural requirement	1,2,4,5
5. Ensure quality control while testing/ sampling and acceptance criteria	1,2,5,7,12

COURSE PLAN – PART II
COURSE OVERVIEW
The course deals with design of concrete mix design under different environmental conditions as per the IS Code. The students will learn the properties of different materials used for making concrete and the test methods to assess its performance. The course enables the student have a clear understanding on the sequence in concrete production, types of machinery used. The course also provides a student an exposure towards the different types of engineered concrete.

COURSE TEACHING AND LEARNING ACTIVITIES			
No.	**Schedule** (3 Hrs/week)	**Topic**	**Mode of Delivery**
1	Jan 2nd week	Introduction and need for the course	Lecture by C&T / PPT
2	Jan 3rd week	Cement manufacturing	
3	Jan 3rd week	Types of cement and its uses	
4	Jan 4th week	Types sources and tests on aggregates, Water	
5	Jan 4th week	Concrete mix design - IS and ACI Method	
6	Feb 1st week	Properties & tests on fresh concrete	
7	Feb 2nd week	Types of concrete and its properties	
8	Feb 3rd week	Tests on harden concrete	
9	Feb 4th week	Stress-strain behavior and thermal properties of concrete	
10	March 1st week	Micro-cracking and other durability issues	
11	March 2nd week	Mineral and chemical admixtures	
12	March 3rd week	Batching, transportation, placing, and curing	
13	March 4th week	Special concretes	
14	April 1st week	Sampling and quality control in Concrete	
15	April 2nd week	Clear doubts and tutorials on advanced technologies, discussions on research and development related to this course.	

COURSE ASSESSMENT METHODS				
S.No.	**Mode of Assessment**	**Week/Date**	**Duration**	**Weightage (%)**
1	Assignment – I	Feb 2nd week		10
2	Cyclic test – I	Feb 3rd week	1 Hour	20
3	Assignment – II	March 3rd week		10
4	Cyclic test – II	March 4th week	1 Hour	20
CPA	Compensation Assessment	April 3rd week	1 Hour	20
5	Final Assessment	As per schedule	3 Hours	40

COURSE EXIT SURVEY

- Feedback from students personally every month (which will remain confidential without revealing your identity to the concerned faculty)
- Exit survey from the students at the end of the session through questionnaire

COURSE POLICY

MODE OF CORRESPONDENCE

1. All the correspondence regarding the course will be communicated through webmail or intimated during class hours.
2. Queries / Clarifications (if necessary) may be e-mailed to jay@nitt.edu or can be communicated directly during Institute working hours.

ATTENDANCE

1. Attendance will be taken by the faculty in all the contact hours. Every student should maintain minimum of 75% attendance in these contact hours along with assessment criteria to attend the final semester examination.
2. Attending all the assessments (except compensation assessment) are MANDATORY for every student.
3. Any student, who fails to maintain 75% attendance need to appear for the compensation assessment.
4. Every student is expected to score minimum of 35% (including all the assessments) to pass the course. Otherwise the student would be declared fail and 'F' grade will be awarded. Further the student can take supplementary examination.

COMPENSATION ASSESSMENT

1. Those students who lacks the minimum attendance and missed any of the cyclic tests (CTs) due to genuine reasons, can appear for compensation assessment (CA) to get eligibility for writing the end semester examination.
2. Student who scores more than 60% marks in the CA will be eligible for attending the end semester examination.
3. For those who have appeared for all CTs and not having minimum attendance, the scores in the CA will not be considered for computing grades.
4. Students not having 75% as minimum attendance at the end of the semester and fail in CA (scoring less than 60%) will not be allowed to take final semester exam. They can appear for supplementary exam.

ACADEMIC HONESTY & PLAGIARISM

1. All the students are expected to be genuine during the course work. Taking of information by means of copying simulations, assignments, looking or attempting to look at another student's paper or bringing and using study material in any form for copying during any assessments is considered as dishonest.
2. Tendering of information such as giving one's program, assignments to another student to use or copy is also considered as plagiarism.
3. Preventing or hampering other students from pursuing their academic activities is also considered as academic dishonesty.
4. Any evidence of such academic dishonesty will result in the loss of marks on that assessment. Additionally, the names of those students so penalized will be reported to the class committee chairperson and HoD of the concerned department.

ADDITIONAL INFORMATION

FOR APPROVAL

Course Faculty _____ **CC-Chairperson** _____ **HOD** _____