



HYDRATION, POROSITY, & STRENGTH OF CEMENTITIOUS MATERIAL

PROF. SUDHIR MISHRA &

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Engineering IIT Kanpur

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Engineering IIT Kanpur

TYPE OF COURSE : Rerun | Elective | PG

COURSE DURATION : 8 weeks (26 July 2021 - 17 Sep 2021)

EXAM DATE : 26 Sep 2021

PRE-REQUISITES : No pre-requisites. Only the fundamental knowledge of Chemistry, Physics and Mathematics at the level of first year of Engineering courses will be required.

INTENDED AUDIENCE : Students of civil engineering in colleges and practicing professionals in the area of cement, concrete and construction industry

INDUSTRIES APPLICABLE TO : The cement, concrete and construction industry should find the course very useful.

COURSE OUTLINE :

Cement and concrete is the backbone of infrastructure development and it is important that engineers have a clear understanding of issues involved not only with cement, hydration and strength development, but also porosity, permeability and durability. With the basic framework using Ordinary Portland Cement, the course focuses on developing the subject in light of advances in chemical and mineral admixtures. Though the subject matter is approached from the point of view of the concrete science, the fact that paste made with OPC alone or in combination with other cementitious materials, is almost never used in the field is not light of. Illustrative examples from actual applications will be included to show the applications of the scientific principles.

ABOUT INSTRUCTOR :

Prof. Sudhir Misra is Professor at the Department of Civil Engineering, Indian Institute of Technology Kanpur and has a keen interest in concrete materials, construction and engineering. He has worked with consulting and construction companies also during his 35 years of professional experience, and also led the effort to initiate a graduate programme in Infrastructure Engineering and Management at IIT Kanpur. He has been a member of committees of the BIS and also worked with professional organizations in Japan and India. His research interests include durability and non-destructive testing of concrete and development and utilization of special concretes. A lecture module of Concrete Engineering and Technology by him is also available online under the NPTEL scheme of the Government of India.

Dr. K.V. Harish is currently working as an Assistant Professor at the Department of Civil Engineering, IIT Kanpur. He completed his Ph. D in 2011 at the Glenn Department of Civil Engineering, Clemson University, South Carolina, USA. During his doctoral studies, he was a recipient of ACI-BASF Foundation Student Fellowship for the academic year 2010-2011. He completed his Bachelors and Masters studies in India and is a University Rank Holder in both degrees. After Masters education, he worked as a Scientist in Structural engineering research center, CSIR Campus for 2 years. His research interests include microstructure of cement based materials, development of high- and ultra-high performance concretes, repair and rehabilitation of concrete structures, sustainable concretes. During the last three years, he has been teaching both undergraduate and graduate courses such as Design of Reinforced Concrete Structure, Special Concretes, Durability of Concrete Structures and Construction Management.

COURSE PLAN :

Week 1 :General

Week 2 : Introduction

Week 3 : Portland Cement Based Paste System

Week 4 : Portland Cement Based Paste System (Contd.)

Week 5 : Mineral Admixtures

Week 6 : Mineral Admixtures (Contd.)

Week 7 : Paste & Concrete

Week 8 : Paste & Concrete (Contd.)