

Course Contents:

Introduction to portland cement concrete: Concrete production operations – Indian Standard and ACI Mix design of concrete – Fresh and hardened properties of concrete – Durability of concrete – Role of ingredients in concrete – Physical and chemical characteristics of pozzolans – Role of admixtures and additives in concrete – Experimental test parameters and measurements during concrete testing; Special cements: Need – Classifications – Blended cements, modified hydraulic cements, calcium aluminate cements, calcium sulfate based binders, calcium sulfo-aluminate cements, GGBS based cements, shrinkage compensating (or) expansive cements – Other special cements: macro-defect free cements, phosphate cements, expansive cements, fast-setting cements, oil well cements – Performance and prescriptive specifications; Special concretes: Importance and need – high performance concrete and property based classifications. Special concretes: Mass concrete, self-compacting or self-consolidating concrete, fiber reinforced concrete, high strength concretes, roller compacting concrete. Other concretes or composites for special properties: high-volume fly ash concretes, geo-polymer concrete, pervious concrete, light weight concrete, aerated concrete, polymer or polymer modified concretes, ultra-high performance concretes, etc. Mixture proportioning and parameters in the development of special concretes; Special concreting operations: Guniting and shotcreting, pre-placed aggregate, anti-washout concretes, concrete pumping, tremie placement for underwater applications and others