



ENVIRONMENTAL GEOTECHNICS

PROF. D. N. SINGH

Department of Civil Engineering
IIT Bombay

TYPE OF COURSE : New | Core/Elective | UG

COURSE DURATION : 12 weeks (29 Jul'19 - 18 Oct'19)

EXAM DATE : 16 Nov 2019

PRE-REQUISITES : Sufficient exposure to Soil Mechanics

INTENDED AUDIENCE : Civil Engineering, Geo- Technical Engineering, Environmental Engineering, Geo-Environmental Engineering.

INDUSTRIES APPLICABLE TO : Those that deal with: power generation, Manufacturing, Mining, Mineral Processing, Chemicals & Pharmaceuticals, Agriculture, Aquaculture, Oil and Petroleum, Dredging, ports, Landfilling, Construction, Infrastructure

COURSE OUTLINE :

A consideration of technical and scientific aspects of key geo-societal issues. Case studies and analysis of current and historic databases will be used to illustrate topics including, but not limited to, impact of climate change, energy resources, water and soil pollution, and health risks posed by heavy metals and emerging pollutants.

ABOUT INSTRUCTOR :

Prof. Devendra Narain Singh is an Institute Chair Professor in Department of Civil Engineering at Indian Institute of Technology Bombay. He obtained his Bachelors, Masters and Ph.D degrees from Indian Institute of Technology Kanpur. His research focuses on geomaterial characterization, contaminant-geomaterial interaction, sensors for soil moisture measurement, utilization of industrial by-products, synthesis and characterization of gas hydrates for renewable energy, municipal solid waste management and other fields associated with environmental geotechnics. He is a fellow of INAE, ASCE and ICE (UK).

COURSE PLAN :

Week 1 : Basic introduction, Scope and Genesis

Week 2 : Contemporary Civil Engineering, Recent Trends

Week 3 : Natural and Manmade Environments, What is Geomaterial, Soil: a living entity

Week 4 : Soil- Water- Environment Interaction, Soil- contaminant Interaction

Week 5 : Contaminant transport and Fate of contaminants, Case Studies, Soil Remediation

Week 6 : Methods for Soil Remediation: Soil Washing, Thermal Desorption, Soil vapor Extraction, Air stripping, Bioventilation, Bio-sparging, Ground freezing, soil heating

Week 7 : Waste: Classification, Sources, forms, Utilization potential, Waste decomposition: Case Studies

Week 8 : Landfills, Leachate generation and detection, Energy generation, Hazardous Waste, Case study: Nuclear waste disposal and its importance

Week 9 : Sustainable development, Utilization of geomaterial for sustainable development, Industrial by-products and their applications

Week 10 : Need and Characterization of Geo-material

Week 11 : Geotechnical Characterization, Physical Characterization, Mineralogical Characterization

Week 12 : Chemical Characterization, concluding remarks and way forward