ENVIRONMENTAL GEOMECHANICS (SWAYAM)
(Professional Elective- II)

Environmental Geomechanics

Course code: 20CE11L2

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Weblink:

https://nptel.ac.in/courses/105101200

Summary

Course Type : Elective

Duration : 12 weeks

Category : Civil Engineering

Credit Points : 3

Level : Undergraduate

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. Upon successful completion of this course, the student would: • Have an exposure to interdisciplinary issues pertaining to environment and geotechnical engineering. • Be trained to develop sustainable and environmentally sound solutions for geoenvironmental issues. Understand the relevance of various legal aspects involved in addressing environmental consequences associated with geotechnical issues

Pre-requisites Basics in Geotechnical Engineering.

Industries Applicable : • Bhabha Atomic Research Centre, • Jawaharlal Nehru Port Trust, • Reliance Industries Limited, • Hindustan Lever Limited, • Council of Scientific and Industrial Research (CSIR), • Hindalco Industries Pvt. Ltd. • Department of Science and Technology, • Indian Council of Agricultural Research, • Municipal Corporations • Landfill operators • Mining Industries

Course layout

Week 1: Introduction, Nature of Soil
Week 2: Natural and Manmade Environments
Week 3: Physico-chemical Characterization of Soil
Week 4: Mineralogical Characterization of Soil
Week 5: Soil-water-air Interaction
Week 6: Shrinkage and Swelling
Week 7: Cracking Characteristics of Soil
Week 8: Hydraulic Conductivity
Week 9: Mass Transport Phenomena
Week 10: Thermal and Electrical Properties of Soils
Week 11: Thermal and Electrical Properties of Soils,cont'd
Week 12: Applications

Books and references

1. Schrefler B.A. and Pierre Delage, “Environmental Geomechanics”, 2nd Edition, ISTE Publications, 2008.
2. Yong, R. N., “Geoenvironmental Engineering, Contaminated Soils, Pollutant Fate, and Mitigation”, 3rd Edition, CRC Press, 2001.
3. Sharma H.D. and Reddy K.R., “Geoenvironmental Engineering: Site Remediation, Waste Containment, and Emerging Waste ManagementTechnologies”, 1st Edition, John Wiley & Sons, Inc., 2004.
4. Hillel D., Introduction to Environmental Soil Physics, 2nd Edition, Academic Press, 2003.
5. Reddi L.N. and Inyang, H. I., Geoenvironmental Engineering, Principles and Applications, 3rd Edition, Marcel Dekker Inc., 2000.
6. Sparks, D.L., Environmental Soil Chemistry, 1st Edition, Academic Press, 2002.
7. Alvarez-Benedi J. and Munoz-Carpena, R., Soil-Water-Solute Process Characterization: An Integrated Approach, 4th Edition, CRC Press, 2005.
8. Berkowitz, B. Dror, I. and Yaron, B., Contaminant Geochemistry, 1st Edition, Springer, 2008