

## Course outline

How does an NPTEL online course work?

Practice Assignment

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

Text Transcripts

## Environmental Geomechanics

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

**INTENDED AUDIENCE** : Civil engineering, Geotechnical engineering, Environmental Engineering, Geoenvironmental Engineering

**PREREQUISITES** : Basics in Geotechnical Engineering

**INDUSTRY SUPPORT** :

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



**Prof. D. N. Singh**

IIT Bombay

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 are geomaterial characterization, contaminant-geomaterial interaction, sensors for soil moisture measurement, modelling of heat migration through soils, utilization of industrial by-products, municipal solid waste management and other fields associated with Environmental Geotechnics since 1994. He guided 36 Ph. Ds and 35 Master students and several are on-going. He is the editor-in-chief for the journal Environmental Geotechnics, ICE (UK)

## COURSE TYPE

Core

## COURSE LEVEL

Postgraduate

## 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  
**Week 12** : Applications

## BOOKS AND REFERENCES

1. Introduction to Environmental Geotechnology by Hsai – Yang Fang
2. CDEEP, IITB video lectures on course CE 488 and CE 641 by Prof. D. N. Singh
3. Acar, Y.B. and Daniel, D.E., "Geoenvironmental 2000: Characterization, Containment, Remediation & Performance in Environmental Geotechnics, ASCE, NY.
4. Hari, D.S. and Krishna R.R., "Geoenvironmental Engineering: Site Remediation, Waste Containment, and Emerging Waste Management Technologies, Wiley, USA
5. Oweis, I.S. and Khera, R.P., "Geotechnology of Waste Management" 2nd Ed, PSW Publishing Company, USA.
6. Rees, J.F., "Contaminated Land Treatment Technologies", SCI, Elsevier Applied Science, NY, USA

## CERTIFICATE

- The course is free to enroll and learn from. But if you want a certificate, you have to register and write the proctored exam conducted by us in person at any of the designated exam centres.
- The exam is optional for a fee of Rs 1000/- (Rupees one thousand only).
- **Date and Time of Exams: 26th April 2020**, Morning session 9am to 12 noon; Afternoon Session 2pm to 5pm.
- Registration url: Announcements will be made when the registration form is open for registrations.
- The online registration form has to be filled and the certification exam fee needs to be paid. More details will be made available when the exam registration form is published. If there are any changes, it will be mentioned then.
- Please check the form for more details on the cities where the exams will be held, the conditions you agree to when you fill the form etc.

### CRITERIA TO GET A CERTIFICATE:

- Average assignment score = 25% of average of best 8 assignments out of the total 12 assignments given in the course.
- Exam score = 75% of the proctored certification exam score out of 100
- Final score = Average assignment score + Exam score

### YOU WILL BE ELIGIBLE FOR A CERTIFICATE ONLY IF AVERAGE ASSIGNMENT SCORE $\geq 10/25$ AND EXAM SCORE $\geq 30/75$ .

- If one of the 2 criteria is not met, you will not get the certificate even if the Final score  $\geq 40/100$ .
- Certificate will have your name, photograph and the score in the final exam with the breakup. It will have the logos of NPTEL and IIT Bombay. It will be e-verifiable at [nptel.ac.in/noc](http://nptel.ac.in/noc).
- Only the e-certificate will be made available. Hard copies will not be dispatched.