



## Environmental Geotechnics

SWAYAM Prabha Course Code - C3

<b>PROFESSOR'S NAME</b>	Prof. Devendra Narain Singh
<b>DEPARTMENT</b>	Civil Department
<b>INSTITUTE</b>	Indian Institute of Technology, Bombay
<b>Course Outline</b>	<p>This course deals with the engineering philosophy that helps in incorporating the influence of environmental effects (either man-made or natural) on conventional geotechnical engineering practices. It is gaining significant attention of the engineers, researchers and planners due to rapid and uncontrolled industrialization, which yields a huge amount of hazardous and toxic waste (contaminants). It is a blend of geotechnical and environmental engineering and basically deals with studies related to safe disposal and handling of the waste, estimation of its spread and fate in the subsurface, methods to contain its spread in the subsurface and development of schemes for remediation of the contaminated land. It also encompasses safe transportation and disposal, and development of a suitable strategy for proper utilization of the waste. Apart from a discussion on these issues, this course highlights the importance and relevance of revising the basic concepts of geotechnical engineering so as to deal with the concerns raised by these issues, in the most befitting manner. In addition to this, the course focuses on pointing out the role and importance of the parameters and mechanisms that govern the interaction of contaminants with geomaterials (soils, rock mass and waste), and their degradation, due to the presence of chemicals and/or radio-nuclides in undesirable concentrations and at elevated temperatures, in the long-run. However, as contaminant-geomaterial interaction is an extremely slow and complex process, and primarily depends on their physical, chemical and mineralogical properties, it is quite difficult to study this interaction under laboratory or in situ conditions. This calls for resorting to various modeling techniques such as accelerated physical modeling, using a</p>

	<p>geotechnical centrifuge, finite element/difference based numerical modelling and physico-chemico-mineralogical modeling techniques. This course also introduces different industrial by-products and their utilization for various civil engineering applications.</p> <p>The contents of this course are mainly based on the research findings of the instructor and his Ph.D. and Masters students who have been instrumental in developing a unique laboratory (Environmental Geotechnology Laboratory) in the Department of Civil Engineering, IIT Bombay. For a virtual visit to the laboratory, you must visit <a href="https://www.civil.iitb.ac.in/~dns/ENVGEO/env.html">https://www.civil.iitb.ac.in/~dns/ENVGEO/env.html</a></p> <p>UG/PG students, research scholars and practicing engineers from Civil Engineering may find this course interesting and useful in their professional activities.</p>
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**COURSE DETAILS**

<b>S. No</b>	<b>Module ID/ Lecture ID</b>	<b>Lecture Title/Topic</b>
1	L1	Introduction- I
2	L2	Introduction- II
3	L3	Overview
4	L4	Civil Engineering and Soil Mechanics
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**References if Any:**