

Course title: Soil Science					
Course code: NRE 130		No. of credits: 3		L-T-P: 28-12-10	
Learning hours: 45					
Pre-requisite course code and title (if any):					
Department: Natural and Applied Sciences					
Course coordinator: Ms Ranjana Ray Chaudhuri			Course instructor: Ms Ranjana Ray Chaudhuri		
Contact details: ranjana.chaudhuri@terisas.ac.in					
Course type: Elective			Course offered in: Semester 2		
Course Description The course will help students to understand soil’s physical attributes, biological composition, and chemical makeup. This knowledge will help them to solve range o f soil management issues. The course will equip students to conservationist to replenish degraded ecosystem.					
Course objective <ul style="list-style-type: none">• To provide skillsets related to monitoring the properties of soil• Imparting knowledge related to agriculture management techniques and conservation of natural resources					
Course content					
Module	Topic	L	T	P	
1.	Soil physical and chemical properties: soil formation and distribution; mobility of nutrient and trace elements during soil genesis; paedogenic evolution and inherent soil nutrient cycle benefits, which enhances its sink and source role	5	4		
2.	Soil biology and biochemistry: fundamental biological and biochemical features and processes occurring in soil systems	5	4		
3.	Soil erosion and conservation: soil erosion and effects of modern agriculture on soil geochemistry, introduction to different conservation and soil remediation practices and reflection on forest ecosystems	13			
4.	Soil pollution: Interactions between industrial effluents and soils; soil contamination with radionuclides.	5	4		
5	Practical’s: <ul style="list-style-type: none">➤ Determination of soil colour by Munsell soil colour chart in field➤ Determination of bulk density (clod coating method) and particle density by pyconometer method and porosity of soil➤ Determination of soil texture by feel method and sieve analysis➤ Determination of soil texture by Bouyoucos hydrometer method➤ Determination of infiltration rate of soil by double ring infiltrometer➤ Determination of pH, conductivity and anion/cation exchange capacity of soil➤ Study of soil map			10	
		25	12	10	
Evaluation criteria All written submissions: Test 1: 30%, Written examination , to assess understanding of soil properties, and processes of soil systems. Evaluation is linked to Module 1&2. Test 2: 30%, Written Assignment and Presentation ; to increasing understanding of the latest research in the fields of soil erosion and conservation and impact of soil pollution due to contamination. Evaluation linked to learning from Module 3&4. Test 3: 50%, Practical submissions and viva , soil samples to be evaluated from nearby ecosystems including forests, urban watersheds and agriculture fields. Evaluation linked to module 5					
Learning outcomes On successfully completing this course the students will be able to: <input type="checkbox"/> <input type="checkbox"/> Examine physico-chemical, mineralogical and biological properties of various types of soil <input type="checkbox"/> <input type="checkbox"/> Assess impact on soil nutrient cycle due to soil erosion and soil pollution and soil remediation techniques and conservation practices <input type="checkbox"/> <input type="checkbox"/> Assess soil health, to reflect on soil’s contribution to its sink and source role and compare with soils which support forest ecosystems and natural vegetation					

Pedagogical approach
Classroom lectures, tutorials and practical
Materials & Required text Fundamentals of Soil Science, 8ed by Henry D Foth, John Wiley Fundamentals of Soil Science by Indian Society of Soil Science (ISSS) Tan, K.H., 2009. <i>Environmental soil science</i> . CRC Press. Rowell, D.L., 2014. <i>Soil science: Methods & applications</i> . Routledge.
Journals Soil biology and biochemistry Soil research Journal of Soil and Water Conservation Indian Journal of Soil Conservation Soil biology and biochemistry Soil research Catena Sedimentology Journal of sedimentary research
Additional information (if any)
Student responsibilities Meeting deadlines for assignment submissions, attending regular classes

Course Reviewers:

1. Dr. Anshumali, Associate Professor, Indian School of Mines, Department of Environmental Science and Engineering, Indian Institute of Technology (ISM) Dhanbad
2. Dr. Abhay Kumar Singh, Sr. Principal Scientist, Central Institute of Mining and Fuel Research, Dhanbad