



SOIL SCIENCE AND TECHNOLOGY



PROF. SOMSUBHRA CHAKRABORTY
Department of Agricultural and Food Engineering
IIT Kharagpur

TYPE OF COURSE : New | Core | UG

COURSE DURATION : 12 weeks (28 Jan'19-19 Apr'19)

INTENDED AUDIENCE : Agriculture, Environmental science
Agricultural engineering

EXAM DATE : 27 April 2019

INDUSTRIES APPLICABLE TO : 1. Fertilizer companies 2. Soil testing services 3. Soil and environmental pollution consulting companies 4. Soil remote sensing solution services

COURSE OUTLINE :

This core course is aimed to provide a basic understanding of various aspects of soil science along with some state-of-the-art technologies. The objective is to provide knowledge of different physical and chemical properties of soil. Most importantly this course will impart different preparatory and exploratory data analysis approaches for unconventional digital soil mapping, modeling and mapping of continuous and categorical soil attributes, hyperspectral and proximal soil sensors and their applications for modeling of soil properties, soil pollution and remediation which are not covered in the traditional courses of soil science.

ABOUT INSTRUCTOR :

He is currently serving as an Assistant Professor (Soil Science) at the Agricultural and Food Engineering Department, Indian Institute of Technology Kharagpur. He was awarded various prestigious fellowships including the Australia Awards Fellowship from the Australian Department of Foreign Affairs and Trade. He did his undergraduate and M.Sc degrees from BCKV and PAU in India and PhD degree in Agronomy (Soil Science emphasis) from Louisiana State University, USA. He started his career as a post-doctoral researcher at West Virginia University, USA. He joined IITKgp as faculty in 2016. He is passionate about the use of proximal and non-invasive sensors for soil management.

COURSE PLAN :

Week 01 : Basic Overview Of Soil, Ecosystem Services Of Soils, Weathering , Soil Formation, Soil Profile

Week 02 : Soil Taxonomy, Soil Orders-1, Soil Orders-2, Soil Colour And Soil Texture, Soil Structure

Week 03 : Soil Tillage And Soil Density, Soil Porosity And Consistency, Soil Water Energy Concepts, : Measurement Of Soil Water, Tutorial

Week 04 : The Flow Of Liquid Water Into Soil, : Qualitative Description Of Soil Wetness, Soil Air, Soil Temperature, Tutorial

Week 05 : Silicate Clays-1, Silicate Clays -2, Sources Of Charges On Soil Colloids, Cation Exchange Capacity, Sorption Of Pesticides In Soil

Week 06 : Diffuse Double Layer Theories , Adsorption Isotherms, Soil Acidity, : Soil Alkalinity And Salinity, Submerged Soils

Week 07 : Essential Plant Nutrients, Soil Nitrogen, Biological Nitrogen Fixation, Soil Phosphorus And Potassium, Fertilizers

Week 08 : Soil Testing-1, Soil Testing-2, Soil Organic Matter And Climate Change, Soil Organisms, Compost

Week 09 : Soil Erosion And Land Degradation, The Universal Soil-Loss Equation, Conservation Tillage, Wind And Tillage Erosion, Toxic Organic Chemicals In Soils

Week 10 : Remediation Of Soil Organic Pollution, Soil Contamination With Toxic Inorganic Substances, Remediation Of Soil Inorganic Pollution, Soil Survey, Remote Sensing In Soil Survey

Week 11 : Gis And Gps, Geostatistics, Basics Of Diffuse Reflectance Spectroscopy, : Diffuse Reflectance Spectroscopy For Soils, PxrF Soil Applications

Week 12 : Overview Of Digital Soil Mapping, Modeling And Mapping Of Continuous Variables, Modeling And Mapping Of Categorical Variables, : Pedotransfer Functions, Accuracy and Uncertainty Of Dsm