

Semester: VIII

23. ADVANCED MAJOR COURSE- AMJ 2: SOIL AND HYDROLOGY

Allotted: 72 Lectures

Course Objective:

1. To familiarise students about nature, scope and significance of soil geography.
2. To make student learn about soil development, hydrology, hydrological cycle, surface and ground water and its management.

Sl.	Unit	Topics	Methodology	Assessment	Outcome
1	Unit 1: 10 Lectures	Nature, scope and significance of Soil Geography; its relationship with Pedology, Soil forming factors: parent material, organic, climatic, topographic, Spatio-temporal dimensions, Processes of soil formation and soil development: Physical, Biotic and Chemical. Soil profile.	<ul style="list-style-type: none"> • Lecture • Digital Classes • Group Discussion • Self-study • EX-situ Examples. 	<ul style="list-style-type: none"> • Quiz on basic concepts • Class Test • Assignments • Presentation 	<ol style="list-style-type: none"> 1. Study the soil as a basic resource, focusing its distribution, problems and management. 2. Understand the basic components of hydrological cycle and comprehend practices of integrated watershed management. 3. Evaluate the water balancing and river basin and water disputes
2	Unit 2: 12 Lectures	Soil organism, macro-animals (earthworms, sowbugs, mites, centipedes, rodents and insects), Micro animals and plants-Nematodes, Protozoa, Rotifers, Fungi, Bacteria, algae and Actinomyces	<ul style="list-style-type: none"> • Lecture • Digital Classes • Group Discussion • Self-study • Ex-situ Examples. 	<ul style="list-style-type: none"> • Quiz on basic concepts and Theories • Class Test • Assignments • Presentation 	<ol style="list-style-type: none"> 1. Study the soil as a basic resource, focusing its distribution, problems and management. 2. Understand the basic components of hydrological cycle and comprehend practices of integrated watershed management. 3. Evaluate the water balancing and river basin and water disputes
3	Unit 3: 15 Lectures	Physical properties of soils: Morphology, Texture, Structure, Water, Air, Temperature and other properties of soil, Chemical properties of soil and soil reaction, Soil erosion, Degradation and Conservation	<ul style="list-style-type: none"> • Lecture • Digital Classes • Group Discussion. • Ex-situ Examples. • Self-study 	<ul style="list-style-type: none"> • Quiz on basic concepts and Theories • Class Test • Assignments • Presentation 	<ol style="list-style-type: none"> 1. Study the soil as a basic resource, focusing its distribution, problems and management. 2. Understand the basic components of hydrological cycle and comprehend practices of integrated watershed management. 3. Evaluate the water balancing and river basin and water disputes

4	Unit 4: 15 Lectures	Definition and scope of hydrology, importance of water, hydrological cycle, water storages – glaciers, river channels, lakes and reservoirs, soil moisture;	<ul style="list-style-type: none"> • Lecture • Digital Classes • Group Discussion • Self-study • Ex-situ Examples. 	<ul style="list-style-type: none"> • Quiz on basic concepts and Theories • Class Test • Assignments • Presentation 	<ol style="list-style-type: none"> 1. Study the soil as a basic resource, focusing its distribution, problems and management. 2. Understand the basic components of hydrological cycle and comprehend practices of integrated watershed management. 3. Evaluate the water balancing and river basin and water disputes
5	Unit 5 20 Lectures	Ground water: characteristics of stream flow, Darcy's law, permeability, infiltration, ground water storage, ground water aquifers in different rock systems, movement and discharge. Water Crisis: a Case study- rural or urban, water management: ground water and surface water	<ul style="list-style-type: none"> • Lecture • Digital Classes • Group Discussion • Self-study • Ex-situ Examples. 	<ul style="list-style-type: none"> • Quiz on basic concepts and Theories • Class Test • Assignments • Presentation 	<ol style="list-style-type: none"> 1. Study the soil as a basic resource, focusing its distribution, problems and management. 2. Understand the basic components of hydrological cycle and comprehend practices of integrated watershed management. 3. Evaluate the water balancing and river basin and water disputes.

Suggested Readings:

1. Miller, R. W. and Donahue, R. L. (1992): Soils: An Introduction to Soils and Plant Growth, Prentice-Hall of India, New Delhi
2. Brady, N. C., and Weil, R. R. (2008): The Nature and Properties of Soils, Prentice Hall, New Jersey
3. Pitty, A. F. (1978): Geography and Soil Properties, Methuen and Co., London
4. Bridges, E. M. and Davidson, D. A. (1982): Principles and Applications of Soil Geography, Longman Group, London