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SSAC-111

**Fundamentals of Soil science**

**3(2+1)**

### Theory

Soil as a natural body, Pedological and edaphological concepts of soil; Soil genesis: soil forming rocks and minerals; weathering, processes and factors of soil formation; Soil Profile, components of soil; Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity; soil taxonomical classification and soils of India; Soil water retention, movement and availability; Soil air, composition, gaseous exchange and plant growth, Soil temperature; source, amount and flow of heat in soil; effect on plant growth, Soil reaction pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability; soil colloids - inorganic and organic; silicate clays: constitution and properties; sources of charge; ion exchange, cation exchange capacity, base saturation;

### Practical

Study of soil profile in field. Study of soil sampling tools, collection of representative soil sample, its processing and storage. Study of soil forming rocks and minerals. Determination of soil density, moisture content and porosity. Determination of soil texture by feel and Bouyoucos Methods. Determination of soil pH and electrical conductivity. Determination of cation exchange capacity of soil. Determination of soil colour.

### Lecture Schedule:Theory

S.N.	Topic	No. of lectures
1.	Soil as a natural body, Pedological and edaphological concepts of soil	1
2.	Soil genesis: soil forming rocks and minerals classification	2
3.	Weathering of rocks - Chemical, Physical and Biological	2
4.	Factors of soil formation, fundamental and specific soil forming processes	2
5.	Soil Profile	1
6.	Definition and components of soil	1
7.	Soil Physical properties- Soil texture, classifications of soil separates, importance of soil texture, particle size analysis. Stoke's law	2

8.	Soil structure and types of soil structure, mechanism of soil structure formation, management of soil structure.	2
9.	Bulk density, particle density and porosity, factors affecting them, agricultural significance and manipulation	1
10.	soil consistence and plasticity and their agricultural significance	1
11.	Soil colour and expression of soil colour with munsell soil colour chart	1
12.	soil taxonomical classification and soils of India	2
13.	Soil water classification, forces of soil water retention	2
14.	Movement of soil water and availability to plants	1
15.	Soil air, composition, gaseous exchange and its composition, importance and in plant growth	2
16.	Soil temperature; source, amount and flow of heat in soil; effect on plant growth,	2
17.	Soil reaction-pH, soil acidity and alkalinity, buffering	1
18.	effect of pH on nutrient availability	1
19.	Soil colloids, types of soil colloids and their significance	2
20.	1:1, 2:1 and 2:1:1 types of layer silicates, their structure and characteristics, sources of charges on soil colloids.	2
21.	Cation and anion exchange phenomenon and factors influencing ion exchange, Base saturation	1

#### Lecture Schedule: Practical

S.N.	Topic	No. of lectures
1.	Study of Soil Profile in field	1
2.	Study of soil sampling tools, Collection of representative sample, its processing and storage	2
3.	Study of soil forming rocks and minerals	2
4.	Determination of bulk density of undisturbed soil by core sampler method.	1
5.	Determination of bulk density of disturbed soil by R D bottle methods	1
6.	Determination of particle density of soil by R D bottle and computation of porosity of soil	1
7.	Determination of lower and upper plastic limit of soil	1
8.	Determination of field capacity, permanent wilting point of soil and WHC	2
9.	Determination of soil texture by feel and Bouyoucos Methods.	1
10.	Determination of soil pH and electrical conductivity	1
11.	Determination of cation exchange capacity of soil	2
12.	Determination of soil colour by munsell colour chart	1

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