Syllabus for B.Sc. (Hons) Agriculture Year – I (Sem. I)

Subject Code: 16AS1102

Subject Short Name: Ag. Chem. 1.1

Subject Name: Fundamentals of Soil Science

Objective:

1. To impart knowledge on soil genesis, basic soil properties with respect to plant growth.

Credits Earned: 3 Credits (2+1)

Course Outcomes: After completion of this course, Students will be able to

- Articulate and retain knowledge relevant to different types of soil.
- Enriched with the knowledge of physical, chemical and biological conditions of soil.
- Acquaint with the instruments used in the soil science laboratory as well as analyse the soil samples and preparing a report.
- Develop the ability to determine the soil density, moisture content, texture, porosity, EC, cation exchange capacity and organic matter content of soil.

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Progressive Assessment (PA)	Viva (V)	Term work (TW)	
2	0	2	3	40	20	20	10	10	100

Theory Content:

Unit	Topics	Contact Hours
1	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, Pedogenic Processes	**4**
2	Soil profile, components of soil; soil physical properties; soil texture, methods of particle size analyses, structure, density and porosity, soil color, consistence and plasticity;	**8**

3	Elementary knowledge of soil taxonomy classification and soils of India.	**2**
4	Soil consistency, soil temperature, soil air, soil water.	**2**
5	Soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability.	**2**
6	Soil colloids- inorganic and organic; Properties of soil colloids and Ion exchange in soils silicate clays: constitution and properties; source of charge ion exchange, cation exchange capacity, base saturation.	**4**
7	Soil organic matter: composition, properties and its influence on soil properties; humic substances – nature and properties. Soil Organisms.	**2**
	Total	**24**

Practical Content:

Unit	Topics	Contact Hours
1	Study of soil sampling tools, collection of representative soil samples, its processing and storage	**2**
2	Study of soil profile in field	**2**
3	Study of general properties of minerals, minerals-silicate and non-silicate minerals, study of rocks-igneous, sedimentary and metamorphic rocks;	**2**
4	Determination of practical density and bulk density of soil and computation of porosity	**2**
5	Determination of soil moisture content and maximum water holding capacity and computation of moisture constants	**2**
6	Determination of soil texture by feel and international pipette method	**2**
7	Study of infiltration rate of soil	**2**
8	Study of soil structure and aggregate analysis	**2**
9	Determination of soil color	**2**

10	Determination of soil pH and electrical conductivity	**2**
	Total	**20**

Reference Books:

1. Introductory soil science, Das P. K., Kalyani Publishers, New Delhi., 2015
2. Fundamentals of soil science, Patil V. D. and Mali C. V., Phoenix publishers , Parbhani, 1999
3. Fundamentals of soil, Sahai V. N., Kalyani Publishers, New Delhi, 1990
4. The nature and properties of soil, Brady N. C. and Well R. R., Pearson education, 2008
5. Fundamentals of Soil Science, Indian Society of Soil Science (ISSS), Indian Society of Soil Science, New Delhi, 2012

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process.

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
25%	25%	20%	10%	10%	10%

Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board may also use any of tools such as demonstration, role play, quiz, brain storming, MOOCs etc.
2. The internal evaluation will be done on the basis of continuous evaluation of students in the class-rooms.
3. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory/ field.
4. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.