

Syllabus for Bachelor of Agriculture

SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

Subject code: 16AS0102

Subject Name: **FUNDAMENTALS OF SOIL SCIENCE**

B.Sc. (Hons.) Agri., **First Year (Sem. - I)**

Objective:

- 1 To acquire the knowledge of formation of different types of soil.
- 2 To gain the knowledge of soil properties and its importance in crop production.

Credit Earned: 2+1= 3 Credits

Course Outcomes:

After completion of this course, student will be able to:-

1. Articulate and retain knowledge relevant to different types of soil.
2. Students will be enriched with the knowledge of physical, chemical and biological conditions of the soil
3. Acquaint with the instruments used in the soil science laboratory as well as analyze the soil samples and preparing a report.

Teaching and Evaluation Scheme:

Teaching Scheme (hours)		Credits	Theory Marks			Practical Marks		Total Marks
Theory	Practical		ESE (E)	IA	CSE	Viva (V)	Term Work (TW)	
2	2	3	50	30	20	25	25	150

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Contents:

Unit	Topics	Contact Hours
Theory		
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.	4
2.	Soil profile, components of soil; soil physical properties; soil texture, methods of particle size analyses, structure, density and porosity, soil colour, consistence and plasticity; elementary knowledge of soil taxonomy classification and soils of India.	10
3.	Soil water retention, movement and availability; soil air, composition; source, amount and flow of heat in soil; soil temperature and plant growth.	2
4.	Soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability.	2
5.	Soil colloids- inorganic and organic; silicate clays: constitution and properties; source of charge ion exchange, cation exchange capacity, base saturation.	2
6.	Soil organic matter: composition, properties and its influence on soil properties; humic substances – nature and properties.	2
7.	Soil organisms ; macro and micro organisms, their beneficial and harmful effects.	2

Unit	Topics	Contact Hours
Practical		
1.	Study of soil sampling tools, collection of representative soil samples, its processing and storage	1
2.	Study of soil profile in field	1
3.	Study of soil forming rocks and minerals	1
4.	Determination of practical density and bulk density of soil and computation of porosity	1
5.	Determination of soil moisture content and maximum water holding capacity and computation of moisture constants	1
6.	Determination of soil texture by feel and international pipette method	1
7.	Study of capillary rise phenomenon of water in soil column and water movement in soil	1
8.	Study of soil map	1
9.	Determination of soil colour	1
10.	Determination of heat transfer in soil	1
11	Determination of soil pH and electrical conductivity	1
12	Determination of cation exchange capacity of soil	1
13	Estimation of organic matter content of soil	1

Reference Books:

1. Introductory soil science
Das P. K. 4th edition 2015, Kalyani Publishers, New Delhi.
2. Fundamentals of soil science
Patil V. D. and Mali C. V. Phoenix publishers , Parbhani
3. Fundamentals of soil
Sahai V. N., Kalyani Publishers, New Delhi
4. The nature and properties of soil
Brady N. C. and Well R. R., Pearson education
5. Fundamentals of Soil Science Published by Indian Society of Soil Science, New Delhi

Instructional Method:

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