UNIVERSITY OF SARGODHA

DEPARTMENT OF SOIL & ENVIRONMENTAL SCIENCES, COLLEGE OF AGRICULTURE

COURSE OUTLINE **Fall 2020**

Course Title: **Soil Genesis and Morphology**

Course Code: **SES-307**

Credit Hours: **3(2-1)**

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DESCRIPTION AND OBJECTIVES

Soil is the collection of natural bodies occupying the part of earth surface capable to support plants and having properties derived from the integrated effect of climate and living organisms acting upon parent material as modified by topography over periods of time. Soil is an integral component of ecological and agricultural systems. Soils occur as a continuum across the landscape and their properties change in a predictable fashion both across the landscape and with depth. An understanding of soil morphology and the spatial distribution of soil properties is critical in the land-use decision making process. In this course, students will learn about weathering processes and nature of parent material, soil genesis, soil forming factors and processes, soil morphology and soil properties used to identify the soil.

INTENDED LEARNING OUTCOMES

- Understand different processes and factors affecting the rate of weathering and production of parent material.
- Study the key soil properties such as texture, structure, colour, pH, parent material etc. which are used in soil morphology
- Identify and differentiate soil horizons.
- Learn about basic approaches to interpret soil and landscape features for various land uses.

COURSE CONTENTS

Theory

1. Weathering of rocks and minerals; Types of parent materials
2. Soil genesis and factors affecting
3. Pedogenic processes
4. Soil morphology
5. Description of soil profiles; Special soil features
6. Diagonestic horizons; Epipedons and Endopedons
7. Soil moisture and temperature regimes

Practical

1. Soil profile description of important soil series
2. Field trips
3. Identification of soil horizons

READINGS

1. Eswaran, H., Rice T., Ahrens R. and Stewart B. A. 2003. Soil Classification. A Global Desk Reference. CRC Press, Boca Raton, Florida, USA.
2. Bashir, E. and R. Bantel. 2001. Soil Science. National Book Foundation, Islamabad.
3. Brady, N.C. and R.R. Weil. 2007. The Nature and Properties of Soils. 14th Ed. Pearson Education, Upper Saddle River, NJ, USA.
4. Brady, N.C. and R.R. Weil. 2009. Elements of the Nature and Properties of Soils. 3rd Ed. Pearson Education, Upper Saddle River, NJ, USA.
5. Hillel, D. 2008. Soil in the Environment: Crucible of Terrestrial Life. Elsevier Inc., Burlington, MA, USA.
6. Singer, M.J. and D.N. Munns. 2002. Soils - An Introduction. 5th ed. Prentice-Hall, Inc., Upper Saddle River, NJ, USA.
7. Das, D.K. 2011. Introductory Soil Science. 3rd ed. Kalyani Publ. New Delhi-110002, India.

COURSE SCHEDULE

Week	Topics and Readings	Books with Page No.
1	Weathering of rocks and minerals. Weathering of rocks and minerals. Soil profile description.	The Nature and Properties of Soils. 23-46
2	Factors affecting the weathering of rocks and minerals. Criteria for selecting site for soil profile description.	The Nature and Properties of Soils.23-46
3	Parent material and its types. Description of site selected for soil profile description.	The Nature and Properties of Soils.23-46
4	Effect of different types of parent material on soil formation. Approaches for soil profile description.	The Nature and Properties of Soils.23-46
5	Factors of soil formation (Climate, Living Organism, Parent Material, Topography and Time). Soil properties used in soil profile description.	The Nature and Properties of Soils.23-46
6	Processes of soil formation (Enrichment, cumulization, melanization, littering, salinization, sodification, Erosion, leaching, evaporation, denitrification, volatilization).	The Nature and Properties of Soils.47-89
7	Pedogenic processes (Decomposition, synthesis, mineralization, immobilization, humification, ripening, eluviations)	The Nature and Properties of Soils.47-89
8	Pedogenic processes (illuviation, pedotubation, Pedogenic processes (lessivage, calcification, paludization).	The Nature and Properties of Soils.47-89
9	Soil morphology (horizon, profile, pedon, polypedon, digonestic horizon.	The Nature and Properties of Soils.47-89
10	Master horizons, Transitional horizons, Subordinate distinctions	The Nature and Properties of Soils. 47-89
11	Field trips	

12	Epipedons used as criteria in soil morphology.	The Nature and Properties of Soils. 47-89
13	Endopedons used as criteria in soil morphology	The Nature and Properties of Soils. 47-89
14	Soil characteristics used in soil morphology.	The Nature and Properties of Soils. 47-89
15	Soil moisture and temperature regimes	The Nature and Properties of Soils. 47-89
16	Soil profile description, components of soil profile description and soil properties used soil profile description	The Nature and Properties of Soils. 47-89

RESEARCH PROJECT/PRACTICAL/LABS/ASSIGNMENTS

ASSIGNMENTS

Following assignments will be given to the studetns

1. Describe physical property important from engineering point of view. Also write its significance with respect to agriculture
2. Describe four most important physical properties and their significance with respect to crop production.
3. Describe role of soil physics in management of environment.

ASSESSMENT CRITERIA

Sessional:	20 % of the total theory marks (Project, Presentation, Participation and Assignment)
Project:	-
Presentation:	-
Participation:	-
Mid Exam:	30 % of the total theory marks
Final Exam:	50 % of the total theory marks
Practical Exam:	100 % of the total practical marks