

ENVS 334—Applied soil science and land management.**3 Credits**

INSTR.: Dr. Roshan M. Bajracharya

Topic	Description/Details	Hours/Week
1. Introduction	Definitions, background and basic concepts	2 hrs (Week 1)
2. The soil profile, soil types and formation	The soil profile, general types of soil, soil formation processes, soil classification and 12 orders	6 hrs (Weeks 2 and 3)
3. Soil physical properties	Soil particle size distribution (textural analysis); density; soil structure and aggregate stability; soil porosity; soil aeration and temperature.	6 hrs (Weeks 4 and 5)
4. Soil water and hydrological characteristics	Nature of water and the soil solution, water potential Soil water infiltration and movement; moisture retention/release curves; plant available water capacity.	8 hrs (Weeks 9 and 10)
5. Chemical properties of soil	Soil acidity (pH), nature of colloids and ion exchange; soil nitrogen, sulphur, phosphorus; potassium, and micronutrients	8 hrs (Weeks 6 and 7)
6. Biological characteristics of soil	Soil organisms: earthworms, termites, ant; micro-fauna, and microflora; roots of higher plants; organic matter (humus), nature and decomposition	4 hrs (Week 8)
7. Land and soil management	Basic concepts of land and soil management; Soil erosion processes and mechanisms; water & wind erosion; erosion prevention and control measures	6 hrs (Weeks 11 and 12)
8. Land use management approaches and principles	Land vs. soil management; approaches to land management; land husbandry; planning for optimum land use; principles of land husbandry.	8 hrs (Weeks 13 and 14)
Practicals: 1. Soil profile description 2. Soil physical properties 3. Soil chemical parameters	<ul style="list-style-type: none"> • Field visit (soil profile; sampling & processing) • Soil moisture content, density (bulk/particle) • Soil organic matter and pH • Soil textural analysis • Aggregate stability • Infiltration capacity 	Week (Hrs) 2 (4 hrs) 3-4 (6 hrs) 5 (3 hrs) 6-7 (6 hrs) 8-9 (6 hrs) 10 (3 hrs)
Assignments:	1. HW assign. 1 (5 marks) 2. Mid-term 1 (7.5 marks) 3. HW assign. 2 (5 marks) 4. Mid-term 2 (7.5 marks) 5. Final Eval. (75 marks)	Week 3 Week 5 Week 8 Week 12

Reference Texts and Course Materials:

1. Brady, N.C. (1995) *The Nature and Properties of Soils*, 10th Ed., Prentice Hall of India Pvt. Ltd., New Delhi, India.
2. Hudson, N. (1995): *Soil Conservation*, Third Edition, Iowa State Univ. Press, Ames, Iowa, USA.
3. Shaxon, (1989) *Land Husbandry – A Framework for Soil and Water Conservation*, Soil & Water Conservation Society and World Assoc. for Soil & Water Conserv., USA.
4. Klute, A., Ed. (1986) *Methods of Soil Analysis, Part 1 – Physical and Mineralogical Methods*, 2nd Ed., ASA/SSSA, Inc., Madison, Wisconsin, USA.
5. Page, A.L., Miller, R.H., Keeny, D.R., Eds. (1982) *Methods of Soil Analysis, Part 2 – Chemical and Microbiological Properties*, 2nd Ed., ASA/SSSA, Inc., Madison, Wisconsin, USA.