### ENVS 334—Applied soil science and land management.

**INSTR.: Dr. Roshan M. Bajracharya**

<table>
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<tr>
<th>Topic</th>
<th>Description/Details</th>
<th>Hours/Week</th>
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<tr>
<td>1. Introduction</td>
<td>Definitions, background and basic concepts</td>
<td>2 hrs (Week 1)</td>
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<tr>
<td>2. The soil profile, soil types and formation</td>
<td>The soil profile, general types of soil, soil formation processes, soil classification and 12 orders</td>
<td>6 hrs (Weeks 2 and 3)</td>
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<td>3. Soil physical properties</td>
<td>Soil particle size distribution (textural analysis); density; soil structure and aggregate stability; soil porosity; soil aeration and temperature.</td>
<td>6 hrs (Weeks 4 and 5)</td>
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<td>4. Soil water and hydrological characteristics</td>
<td>Nature of water and the soil solution, water potential Soil water infiltration and movement; moisture retention/release curves; plant available water capacity.</td>
<td>8 hrs (Weeks 9 and 10)</td>
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<td>5. Chemical properties of soil</td>
<td>Soil acidity (pH), nature of colloids and ion exchange; soil nitrogen, sulphur, phosphorus; potassium, and micronutrients</td>
<td>8 hrs (Weeks 6 and 7)</td>
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<td>6. Biological characteristics of soil</td>
<td>Soil organisms: earthworms, termites, ant; micro-fauna, and microflora; roots of higher plants; organic matter (humus), nature and decomposition</td>
<td>4 hrs (Week 8)</td>
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<td>7. Land and soil management</td>
<td>Basic concepts of land and soil management; Soil erosion processes and mechanisms; water &amp; wind erosion; erosion prevention and control measures</td>
<td>6 hrs (Weeks 11 and 12)</td>
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<td>8. Land use management approaches and principles</td>
<td>Land vs. soil management; approaches to land management; land husbandry; planning for optimum land use; principles of land husbandry.</td>
<td>8 hrs (Weeks 13 and 14)</td>
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**Practicals:**

1. Soil profile description
2. Soil physical properties
3. Soil chemical parameters
   - Field visit (soil profile; sampling & processing)
   - Soil moisture content, density (bulk/particle)
   - Soil organic matter and pH
   - Soil textural analysis
   - Aggregate stability
   - Infiltration capacity

**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)

**Reference Texts and Course Materials:**