Grande Prairie Regional College
Department of Science and Technology

# INTRODUCTION TO SOIL SCIENCE FO 1220
## (Fall 1997)

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| Instructor: | C. Shang, Office C410; Tel: 539-xxxx |
| Prerequisite: | Introduction to Chemistry (CH 1010) |
| Transfer credits: | University of Alberta, Soils 210 |
| Lecture: | Monday, Wednesday & Friday<br>12:00 P.M. - 12:50 P.M., Room E311 |
| Laboratory: | Wednesday, 8:00 - 10:50 A.M. |
| Textbooks: | Brady, N. C. and R. R. Weil. 1996. The Nature and Properties of Soils. 11th Edition. Prentice-Hall, Inc., A Simon & Schuster Company, Upper Saddle River, NJ.<br><br>Canada Department of Agriculture. 1974. The System of Soil Classification for Canada. |
| Lab manual: | U. of Alberta. 1997. Soil Science 210.3-Laboratory Manual. |

## COURSE OUTLINE

1. Introduction
   - 1.1) Functions of soil
   - 1.2) Aspects of soil study

2. Soil as a product of the environment
   - 2.1) Soil as a three-phase system
   - 2.3) Soil profile and horizon
   - 2.4) Descriptive properties: texture, color, and structure

3. Soil constituents (solid phase)
   - 3.1) Soil minerals and clays
   - 3.2) Soil organic matter
   - 3.3) Soil organisms
   - 3.4) Plant nutrients

4. Soil water (liquid phase)
   - 4.1) Water content, potential and classification
   - 4.2) Water movements in soil
   - 4.3) Soil water-plant relationship
   - 4.4) Water budget

5. Soil air (gas phase)
   - 5.1) Composition of soil air
   - 5.2) Soil aeration and management

6. Soil temperature
   - 6.1) The balance of solar energy on the earth's surface
   - 6.2) Soil temperature management

7. Soil chemical properties and processes
   - 7.1) Cation exchange and ion adsorption
   - 7.2) Acidity and alkalinity
   - 7.3) Acid and slat-affected soils

8. Soil fertility
   - 8.1) Carbon cycling
   - 8.2) Nitrogen, phosphorus and sulfur
   - 8.3) Potassium, calcium and magnesium
   - 8.4) Micronutrients
   - 8.5) Soil testing and fertilization

9. Soil formation
   - 9.1) Weathering processes

9.2) Formation of landscape
9.3) Soil formation factors
9.4) Case study-Alberta

10. Soil classification
    10.1) History and concept of soil classification
    10.2) The Canadian system
    10.3) Soil surveys and maps
    10.4) Soils in Alberta and Canada

11. Soil productivity and land resources
    10.1) Land classification
    10.2) Soil conservation
    10.3) Soil pollution
    10.4) Soil information

## COURSE EVALUATION

| | Number | % of total |
|---|---|---|
| Assignments | 5 | 5% |
| Mid-term exams | 2 | 30% |
| Laboratory | 10 | 25% |
| Final exam | 1 | 40% |

| Grade | Marks (%) |
|---|---|
| 9 | 90-100 |
| 8 | 80-89 |
| 7 | 74-79 |
| 6 | 66-73 |
| 5 | 56-65 |
| 4 | 50-55 (pass) |
| 3 | 45-49 |
| 2 | 36-44 |

## 1997 LAB SCHEDULE

| Week | Date | Exercise |
|---|---|---|
| 1 | Sept. 10 | Field trip – soil profile and horizons |
| 2 | Sept. 17 | Soil sampling - profile samples and composite samples |
| 3 | Sept. 24 | Soil treatment, soil color |
| 4 | Oct. 1 | Soil bulk density, hygroscopic moisture of soil samples |
| 5 | Oct. 8 | Soil texture |
| 6 | Oct. 15 | Soil organic matter |
| 7 | Oct. 22 | Soil water constants and water retention |
| 8 | Oct. 29 | Cation exchange capacity |
| 9 | Nov. 5 | Soil pH and electrical conductivity |
| 10 | Nov. 12 | Rocks, minerals, parent materials (optional) |
| 11 | Nov. 19 | Description of soil profiles, classification |
| 12 | Nov. 26 | Soil maps |
| 13 | Dec. 3 | Reports |