Grande Prairie Regional College
Department of Science and Technology

INTRODUCTION TO SOIL SCIENCE FO 1220
(Winter 1998)

Instructor:	C. Shang, Office C410; Tel: 539-2011
Prerequisite:	Introduction to Chemistry (CH 1010)
Transfer credits:	University of Alberta, Soils 210
Lecture:	Monday, Wednesday & Friday 9:00 P.M. - 9:50 P.M., Room J202
Laboratory:	Thursday, 15:00 - 17:50 P.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.
Lab manual:	GPRC, 1998. F1220 Lab 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 profile and horizon
   - 2.2) Descriptive properties: color, texture, and structure
   - 2.3) Soil as a three-phase system: bulk density, porosity, and water content

3. Soil constituents (solid phase)
   - 3.1) Soil clays and clay minerals
   - 3.2) Soil organic matter
   - 3.3) Other soil constituents (organisms and plant nutrients)

4. Soil organisms
   - 4.1) Microbial metabolisms
   - 4.2) Earthworms and functions
   - 4.3) Soil fungi and actinomycetes
   - 4.4) Soil bacteria and functions

5. Soil water (liquid phase)
   - 5.1) Soil water energy concept and water potential
   - 5.2) Water movements in soil
   - 5.3) Soil water classification
   - 5.4) Soil water-plant relationship
   - 5.5) Water budget

6. Soil air (gas phase) and soil temperature
   - 6.1) Soil aeration, redox processes
   - 6.2) Soil aeration management
   - 6.3) The balance of solar energy on the earth's surface
   - 6.4) Soil thermal properties, and temperature management

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

8. Soil fertility
   - 8.1) Carbon cycling
   - 8.2) Nitrogen, and sulfur
   - 8.3) Phosphorus and potassium
   - 8.4) Calcium, magnesium and micronutrients

8.5) Plant nutrition and fertilization

9. Soil geomorphology
   - 9.1) Physical background
   - 9.2) Rocks and minerals, and their weathering
   - 9.3) Glaciation and landforms
   - 9.4) Soil parent materials
   - 9.5) Soil formation and formation factors

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 and soil pollution
   - 10.3) Soil information

1998 LAB SCHEDULE

Week	Lab date	Exercise
1	Jan 8	Soil treatment, soil color
2	Jan 15	Soil bulk density, air-dry moisture of soil samples
3	Jan 22	Soil texture
4	Jan 29	Soil organic matter
5	Feb 5	**Midterm break**
6	Feb 12	Soil water constants and water retention
7	Feb 19	Cation exchange capacity
8	Feb 26	**Winter break**
9	March 5	Soil pH and electrical conductivity
10	March 12	Rocks, minerals, parent materials
11	March 19	Rocks, minerals, parent materials
12	March 26	Description of soil profiles, and soil classification
13	April 2	Soil maps
14	April 10	**Good Friday**

COURSE EVALUATION

	Number	% of total
Assignments	5	5%
Mid-term exams	2	30%
Laboratory	11	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