

# SOILS 402 - CHEMISTRY OF SOILS AND FERTILIZERS

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**Text:** SOIL FERTILITY AND FERTILIZERS, Havlin, Beaton, Tisdale, and Nelson, 7<sup>th</sup> Edition  
Try to read ahead. The lectures will make more sense.

**Office Hours:** You are welcome to stop in anytime I am around. Preferably not right before class.  
Since I have significant extension travel, it is probably a good idea to check if I am around or make an appointment to be sure. Call or email.

**Web site:** Lecture notes will be posted along with other class materials on ANGEL.

**Structure of the Course:** Lectures on most Mondays, Wednesday and Fridays

Problem sets  
Turn in for grade  
Go over in class

Labs 1:25 – 3:20 Monday, Room 13 ASI  
I will handout the labs ahead of time. Be sure to read it over before you come to lab.

## 2008 Lab Schedule

Date	Lab	Date	Lab
1/14	No Lab	3/10	Spring Break
1/21	No Lab	3/17	Start N Lab
1/28	No Lab	3/24	EXAM*
2/4	Tour Soil Test Lab	3/31	Continue N Lab
2/11	Mehlich 3 Soil Test Lab	4/7	Precision Ag
2/18	Exam*	4/14	Finish N Lab
2/25	pH Lab	4/21	No Lab
3/3	No Lab	4/28	Fertilizer Application

\* Location TBA

**Grade:** Two exams and a final @ 25% each  
Scheduled for 2/18/08 and 3/24/08 during lab period.  
Final during Finals period

Labs and problem sets 25% (1/2 problems - 1/2 labs)

Academic integrity, as defined by University Faculty Senate Policy 49-20, is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students

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## *Course Outline*

### **Introduction**

- Fertilizer use and crop production in the U.S. and the world; fertilizers as pollutants, nutrient response models  
*Reading assignment: Text - Chapt. 1, pp. 1-9*

### **Plant Nutrition**

- Overview of essential nutrients, their function in plants and common deficiency symptoms  
*Reading assignment: Text - Chapt. 1, pp. 10-12*

### **Soil-Plant Relationships**

- The soil solution processes that determine solution composition: quantity, intensity, and ion activity concepts, cation and anion exchange, adsorption, solubility.  
*Reading assignment: Text - Chapt. 2, pp. 14-32*
- Nutrient mobility, ion uptake by plant roots, chemistry and biology of the root-soil interface.  
*Reading assignment: Text - Chapt. 2, pp. 32-41*

### **Soil Testing**

- Principles and uses of soil testing for fertility management  
*Reading assignment: Text - Chapt. 9, pp. 324-359*

### **Plant Analysis**

- Principles and uses of plant analysis for fertility management  
*Reading assignment: Text - Chapt. 9, pp. 302-324*

### **Soil Acidity and Alkalinity Relationships and Management**

- Soil acidity, Al and Mn toxicity and liming.  
*Reading assignment: Text - Chapt. 3, pp.45-80.*
- Soil salinity and alkalinity.  
*Reading assignment: Text - Chapt. 3, pp. 81-93.*

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## **Nitrogen**

- Soil nitrogen behavior and management  
*Reading assignment: Text - Chapt. 4.*

## **Phosphorus**

- Soil phosphorus behavior and management  
*Reading assignment: Text - Chapt. 5.*

## **Potassium**

- Soil potassium behavior and management  
*Reading assignment: Text - Chapt. 6.*

## **Calcium and Magnesium**

- Soil Calcium and Magnesium behavior and management  
*Reading assignment: Text - Chapt. 7, pp. 234-241*

## **Sulfur**

- Soil Sulfur behavior and management  
*Reading assignment: Text - Chapt. 7, pp. 219-234*

## **Micronutrients**

- Soil micronutrient behavior and management  
*Reading assignment: Text - Chapt. 8*

## **Nutrient Management**

- Fertilizer technology and use.  
*Reading assignment: Text - Chapt. 10, pp. 362-404, Chapt. 12*
- Manure Nutrient Management  
*Reading assignment: Text - Chapt. 10, pp. 404-414*
- Nutrient Management as part of a system  
*Reading assignment: Text - Chapt. 13 475-501*