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SOCR 351  
Soil Fertility Laboratory  
Syllabus – Fall 2018

Instructor: Dr. Jim Ippolito  
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**Course Time: Thursdays from 1:00 to 2:40**  
**Location: W03 Plant Science**

### **Textbook**

- No required textbook, except this lab manual.
- Supplemental handouts and lab procedures will be posted in Canvas. You will need to print these out and add them to your lab notebook.
- Please devote a three-ring binder exclusively as a lab notebook.
- Even though we will be working in lab groups, each student should have copies of all material in their lab notebook and to keep this notebook up to date.

### **Course Description**

The objective of this course is to teach students central facts, ideas, and theories related to soil chemical and biological properties influencing nutrient acquisition by plants. Students will learn how to gather and evaluate information relating to fertilizer application and nutrient management, then use this information to make nutrient and fertilizer recommendations. Students will be required to gather, analyze, and display soil nutrient data and draw conclusions based on that data. Students will be presented with real-world problems that they must solve using collected data in conjunction with logical reasoning. Course materials presented in lectures, laboratory exercises, and field trips are designed to re-enforce concepts taught in SOCR 350 and provide additional depth to student understanding of the soil analysis and nutrient recommendation process.

### **Course Objectives**

1. To illustrate and expand principles presented in lecture through demonstrations and experimentation.
  2. To get first-hand experience in soil analysis using quantitative techniques.
  3. To develop an understanding and appreciation for diagnosing soils with the ultimate objective of making economically and environmentally sound fertilizer recommendations.
  4. To develop skills in making fertilizer recommendations.
  5. To develop skills in data interpretation.
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### **Classroom Attendance Policy**

Attendance is required because the lab activities cannot be duplicated outside of the lab period. Make-up work will only be allowed if students have cleared it with the instructor prior to the lab, and the students have a documented and acceptable reason for missing class.

**Each student should bring a 5 gallon soil sample to class before September 6, 2018.** The soil sample will be used throughout the semester so that you will do all of the basic soil fertility tests on that sample and then write-up a Final Soil Test Recommendation for your soil. **The Soil Test Results and Fertilizer Recommendation for your soil is due at the end of the semester. A final soils report page is located on page 75 of this lab manual.** Take the time to get a meaningful soil sample! It could be from your family farm or your apartment garden or lawn, or you could get it from a farm where you interned last summer. There are lots of options. Just don't grab it from the bushes outside of the Plant Sciences Building.

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## Student Performance Evaluation

Lab Assignments (10 x 25 pts each =250)

A = 90-100%

B = 80-90%

C = 70-80%

D = 60-70%

F = <60%

### Lab Cleanup

- Clean up the area that you used, leaving the bench-top area neat and well organized. **If you labeled glassware with tape, make sure you remove it.** Wash all glassware with tap water and **rinse with distilled water.**
- Soil should be dumped into the buckets provided for you. Do not pour soil down the drains because the drains will become clogged.
- Leave all apparatus as you found them. Return all reagent bottles to the shelves, cupboards, or designated areas on the bench-tops.

### BASIC SAFETY

1. Safety glasses or goggles must be worn in the laboratory when doing laboratory exercises that involve anything except soil and water.
  2. Lab coats are not provided but can be worn if you have one. It may save holes and stains in clothing.
  3. **Sandals and bare feet are not allowed in the laboratory since we, and other labs utilizing the room, will be using acid during several laboratory exercises. There is also the possibility of broken glassware on the floor.**
  4. Acids:
    - a. Rinse acid from skin immediately. An eye-wash is located in the hall.
    - b. Use the shower in case of large acid spills on skin and/or clothing.
    - c. Concentrated acids such as nitric and sulfuric will digest organic matter, such as skin, very quickly.
    - d. **ALWAYS ADD ACID TO WATER SO THERE WILL NOT BE A VIOLENT EXOTHERMIC REACTION.**
    - e. Neutralize acid spills with sodium bicarbonate solution or powder provided in the laboratory. Do not attempt to simply wipe up acid spills.
    - f. Always notify your lab instructor if acid or other chemical spills occur.
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## LAB ASSIGNMENTS

Most exercises in the Lab Manual are followed by several questions pertaining to that week's material. These questions will help solidify your understanding of that week's material as well as serve as guidance for putting together end of the semester thoughts regarding fertilizer recommendations for your soil.

*If assigned*, assignments are due 1 week after the lab is completed.

## SOCR 351 Schedule Fall 2018

Lab	Topic	Date
	Prepping your soils	8/30
1	Soil Sampling Theory and Creating a Sampling Plan	9/6
2	Soil pH	9/13
3	Soil Organic Matter	9/20
4	Soil Nitrate and Ammonium	9/27
5	Soil Nitrate and Ammonium (data discussion)	10/4
6	Available Soil Phosphorus	10/11
7	Can P Leach? Leaching Study	10/18
8	Exchangeable Bases K, Ca, Mg, Na	10/25
9	Salinity and Sodicity: EC and SAR	11/1
	No Lab – American Society of Agronomy Meetings	11/8
10	Micronutrients	11/15
	No Lab – Thanksgiving Break	11/22
11	Field Trip to Soil Testing Lab and EcoCore Lab	11/29
12	Putting it all together – Fertilizer Recommendations	12/6

*NOTE: You might have all data necessary to start putting together fertilizer recommendations (lab 13) over or immediately after Thanksgiving break. By doing so, you may actually complete the lab earlier than on 12/6.*

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