Soil Fertility
ENR 5270, 3 credit hours, Autumn 2018
Tuesdays and Thursdays from 11:10 – 12:25 PM
333 Kottman Hall in Columbus & 123 Williams Hall in Wooster

Instructor: Dr. Steve Culman, 130 Williams Hall in Wooster, culman.2@osu.edu, 330-263-3787

Course Description and Objectives: This course provides a broad overview of the principles of soil fertility, plant nutrition, and nutrient management in managed ecosystems.

The specific course objectives include:
1) Understand nutrient cycling and nutrient behavior in soils
2) Understand the essential plant nutrients and the role and function of nutrients in plants
3) Understand relationships between fertilizers, soils, and plant productivity and how these components dynamically interact to influence environmental quality and farmer profitability.

Prerequisites: ENR 3000 and ENR 300.01 (Soil Science and Soil Science Laboratory), or Grad standing and permission of instructor.

Required Text: There is no required text for this course.

Recommended Text: The Havlin textbook is the essential reference on soil fertility. It is a must have if you plan on working in the field of soil fertility/ nutrient management in your career.

Additional texts that provide a broad overview of soil fertility and nutrient management principles. Not as much detail as Havlin, but good for agricultural practitioners that want to core concepts.

Office Hours: Immediately after class, or Tuesdays 1-3pm in Columbus by appointment; Thursdays 1-3pm in Wooster by appointment.

Grading: Grades will be based upon the following scale:
A (100-93%); A- (92-90%); B+ (89-87%); B (86-83%); B- (82-80%); C+ (79-77%); C (76-73%); C- (72-70%); D+ (69-67%); D (66-63%); D- (62-60%)
The breakdown of percentage is as follows for both undergraduates and graduate students:

- 5 of 6 Quizzes (10% each)    50% of course grade
- 6 Assignments (5% each)  30% of course grade
- Comprehensive Exam  20% of course grade
- Total  100% of course grade

**Quizzes:** Six quizzes will be given online every 2-3 weeks and cover the material presented since the last quiz. Students can drop their lowest score, counting only the top 5 scores toward their final grade. Quizzes will be timed and can be taken within a 72-hr window, but must be taken before the start of class on Tuesday (11:10am). **No make-up quizzes** will be allowed unless arranged **prior** to the scheduled quiz. The due dates for the quizzes are:

- 1st Quiz: September 4th
- 2nd Quiz: September 18th
- 3rd Quiz: October 9th
- 4th Quiz: October 30th
- 5th Quiz: November 13th
- 6th Quiz: December 4th
- Optional Final Exam: Monday, December 10th, 12:00 – 1:45 PM

**Assignment:** Assignments or problem sets are intended to test the student’s comprehension of the material through practical application. Like quizzes, assignments are due prior the start of class (11:10am). **Late assignments will have 20% reduction in grade per day and will not be accepted 5 days after their due date.** The due dates for assignments are:

- pH and Liming: September 4th
- N Evaluation: September 18th
- Farm Science Review Essay: September 25th
- P Risk Index: October 9th
- P & K Evaluation: October 18th
- Data centered review: November 6th
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<tr>
<th>Week (Date)</th>
<th>Topics</th>
<th>Reading</th>
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| Week 1 (Aug 21, 23) | Course Overview, Introduction to Soil Fertility  
Basic Plant-Soil Relationships | Havlin Ch. 1 & 2             |
| Week 2 (Aug 28, Aug 30) | Soil Acidity and Alkalinity – Assignment #1 & Quiz #1 | Havlin Ch. 3                |
| Week 3 (Sept 4, 6)      | Nitrogen Cycle – Overview and Additions  
Nitrogen Cycle – Transformations and Losses | Havlin Ch. 4                |
| Week 4 (Sept 11, 13) | Nitrogen Management – Fertilizers  
Evaluating N Needs – Assignment #2 & Quiz #2 | Havlin Ch. 4 & 9            |
| Week 5 (Sept 18, 20) | Farm Science Review / Paper Review – Assignment #3 |                             |
| Week 6 (Sept 25, 27) | Phosphorus Cycle – Overview, Additions,  
Transformations  
Phosphorus Management – Fertilizers | Havlin Ch. 5                |
| Week 7 (Oct 2, 4)      | Phosphorus – P and Water Quality in Ohio (LaBarge)  
P Risk Index (Dayton) – Assignment #4 & Quiz #3 | Havlin Ch. 5                |
| Week 8 (Oct 9, 11)    | Potassium  
Fall Break – No Class (13th) | Havlin Ch. 6                |
| Week 9 (Oct 16, 18)  | Evaluating Soil Fertility #1 – Assignment #5  
Calcium, Magnesium, Sulfur | Havlin Ch. 7 & 8            |
| Week 10 (Oct 23, 25) | Micronutrients  
Evaluating Soil Fertility #2 – Quiz #4 | Havlin Ch. 9 & 10           |
| Week 11 (Oct 30, Nov 1) | Using Imagery for Nutrient Management (Fulton)  
Variable Rate Applications - Assignment #6 | Havlin Ch. 9 & 10           |
| Week 12 (Nov 6, 8) | Conservation Tillage, Crop Rotations and Cover Crops  
Soil Health Measurements #1 – Quiz #5 | Havlin Ch. 10 & 12          |
| Week 13 (Nov 13, 15) | Soil Health Measurements #2  
Manure research in Ohio (Arnold) |                             |
| Week 14 (Nov 20, 22) | Comprehensive Exam  
No Classes – Thanksgiving Break (24th) |                             |
Academic Misconduct

Academic integrity is essential in maintaining excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University’s Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University’s Code of Student Conduct and this syllabus may constitute “Academic Misconduct.”

The Ohio State University’s Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: “Any activity that tends to compromise the academic integrity of the University, or subvert the educational process.” Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University’s Code of Student Conduct is never considered an “excuse” for academic misconduct. Please review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University’s Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

Disability

Students with disabilities that have been certified by the Office for Disabilities Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs.