

SOIL 7210 Topics in Soil Fertility: Management of Agricultural Phosphorus
January - April 2016, Tuesdays and Thursdays 8:30-10:00 pm, Room 342 Ellis
DRAFT #2 – January 1, 2016

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Course Objectives (formal description)

The technical content for the course will be aimed at the graduate level, assuming that students are already well-grounded in soil fertility at the undergraduate level. After completing this course, students will have an advanced level of knowledge in a representative number of topic areas in soil fertility and/or nutrient management outside a specialized focus on nitrogen, which is covered in SOIL 7140 (see topics for this year's "topics" course on last page).

The focus of the course will be on the fundamental behaviour of nutrients in soil and how that knowledge can be applied to the determination of nutrient requirements and management for crop production, agricultural sustainability and environmental protection. In addition to acquiring technical knowledge, students will also further develop their critical thinking skills (e.g., by evaluating and discussing assigned readings from scientific journals and by discussing case studies and other problems) and their communication skills (e.g., by writing several short summary papers and at least one major review paper and by presenting their review paper orally for discussion).

Format for the Course

The learning process will consist of an introduction to a topic, followed by an interactive discussion among the students and between the students and the instructors for the course. Therefore, all students will have the responsibility to prepare themselves well for each topic and to contribute informed opinion to each discussion session. The class will meet twice per week for a total of 24-26 sessions. Each session will be approximately 1.5 hours in length and will be arranged in one of two types of sessions, consisting of:

A. General Review of Literature

- Introduction from the discussion topic leader (15-30 minutes) - the leader will be Dr. Flaten, another professor, graduate student or scientist
- Oral presentation of a review paper by a student presenter or scientist (30 minutes) - the student presentation will supplement a general review paper from the literature
 - copies of the students' review papers will be duplicated and circulated to course participants at least one week prior to the class during which the material will be discussed (see detailed instructions that follow).
 - oral presentations will be evaluated for technical content and presentation technique
- Discussion regarding the presentation and review article(s) (30-45 minutes)

Assignment for student presenter's and assigned written review papers: Compose three questions that could be asked to initiate discussion in the session. Ask "open-ended" or "thinking-type" questions that focus on analysis, creativity, adaptation, or evaluation and which are not easily answered by a simple yes, no, or memorized fact. The three questions should focus on the following three perspectives:

- 1) fundamental processes in that topic area, including effects of temporal and spatial variability
- 2) practical implications for agronomic production
- 3) practical implications for environmental protection or sustainability

All students (including the presenter) shall complete the assignment. Assignments should be typed, single spaced, and fit onto a single sheet. Assignments are due at the end of each discussion period.

B. Discussion of Assigned Scientific Research Papers

- Discussion of assigned readings of research papers (75 minutes)
 - required readings in scientific journals and other sources will be assigned to each topic
 - all students should read the assigned papers carefully, complete the assigned reading exercises and be prepared for a series of oral questions on the assigned readings (see detailed instructions that follow)
- Introduction of next week's topic, readings and expectations (5 minutes)

Assignment for each of the assigned readings from research papers ... two parts for each paper:

- 1) Identify the most important strength or contribution to knowledge in the paper. Briefly explain and justify (1 paragraph).
- 2) Identify the greatest weakness in the paper or the next logical step required to expand knowledge in the area. Briefly explain and justify (1 paragraph).

Assignments should be typed, single spaced, and fit onto a single sheet. Assignments are due at the end of each discussion period.

Instructions for Student's Review Papers

1) Written Review Papers

- focus on 10 to 20 key papers that illustrate contemporary knowledge in a topic that complements the published review. This topic will be determined by Dr. Flaten in consultation with the student.
- papers should be 10 pages in length, excluding figures, tables and references, using an 11 point font and allowing a 1.5 line spacing to allow readers to add comments
- provide an introduction, body and summary or conclusion for the paper, plus a complete list of references. Most of the body for the paper should emphasize the fundamental processes in that topic area; however, the practical implications for agronomic production and environmental protection should also be addressed briefly.
- students must meet with Dr. Flaten at least three weeks prior to their presentation to discuss their proposed outlines and references
- each student will be required to submit two versions of their review paper: the first version is presented to the class; the second is revised based on feedback received from professors and students.
- the first version of the review paper must be duplicated and distributed to all class participants the week prior to the oral presentation.

2) Oral Presentation of Review

- use standard practices for good oral presentations, with an obvious introduction, body and conclusion, as indicated on the evaluation sheet.

Evaluation and Marking Scheme:

Attendance and participation in the discussion periods is compulsory. Students will be graded according to the following:

Weekly assignments	35%
First version of review paper	25%
Oral presentation of review paper	15%
Revised version of review paper	10%
Participation in discussion	15%
Late penalties	25% for each 24 hour period

Plagiarism or any other form of cheating in academic work is subject to serious academic penalty including suspension or expulsion from the faculty or university. To plagiarize is to take ideas or words of another person and pass them off as one's own. Plagiarism applies to any written work, in traditional or electronic format, as well as orally or verbally presented work. It is not necessary to state the source of well known or easily verifiable facts, but students are expected to appropriately acknowledge the sources of ideas and expressions they use in their written work, whether quoted directly or paraphrased. This applies to images, diagrams, or statistical tables, as well as to written material, and materials or information from Internet sources. To provide adequate and correct documentation is not only an indication of academic honesty but is also a courtesy which enables the reader to consult these sources with ease. Failure to provide appropriate citations constitutes plagiarism. When in doubt about any practice, ask your advisor or professor and refer to the Student Advocacy website.

Suggested General References:

Phosphorus: Agriculture and the Environment (PAE). 2005. J.T. Sims and A.N. Sharpley, eds.
The Role of Phosphorus in Agriculture. 1980. F.E. Khasawneh, E.C. Sample, and E.J. Kamprath, eds.
Soil Fertility and Fertilizers (Seventh Edition). 2005. J.L. Havlin, J.D. Beaton, S.L. Tisdale, and W.L. Nelson

**Winter 2016 Schedule for SOIL 7210 Topics in Soil Fertility
(Draft #2 – January 1, 2016)**

Sessions are scheduled for Tuesday and Thursday mornings, from 8:30 until 10:00 am
in Room 342 Ellis Building.

SOIL 7210 Topics in Soil Fertility: Schedule for Jan to April 2016 - v2				
	Topic	Presenter	Dates	Student Presenter
	No class		Jan 7	
	Introduction/review - P		Jan 12	
	Introduction/review - P		Jan 14	
	Introduction/review - P		Jan 19	
	No class - Ag Days Soybean Panel, Brandon		Jan 21	
1	Soil P - Inorganic Forms & Dynamics PAE* Ch 3 p53-86		Jan 26	
	No class - MB Pulse Growers Mtg, Portage		Jan 28	
2	Soil P - Inorganic Forms & Dynamics papers		Feb 2	
	No Class - MB Society of Soil Science Annual Mtg.		Feb 4	
3	Soil P – Organic Forms and Dynamics PAE Ch 4 p87-121		Feb 9	
4	Soil P – Organic Forms and Dynamics papers		Feb 11	
	No Class - Midterm Break		Feb 16	
	No Class - Midterm Break		Feb 18	
5	Reactions of P Fertilizer and Byproducts with Soil PAE Ch 7 p181-252		Feb 23	Nick or Theresa?
6	Reactions of P Fertilizer and Byproducts with Soil papers		Feb 25	
7	Soil-Root Interactions & P Nutrition PAE Ch 12 p379-414		Mar 1	Gustavo?
8	Soil-Root Interactions & P Nutrition papers		Mar 3	
9	Plant-Rhizosphere Organism Interactions PAE Ch 14 p437-494		Mar 8	
10	Plant-Rhizosphere Organism Interactions papers		Mar 10	
11	Soil P Testing for Agronomic Purposes (PAE Ch 5?)		Mar 15	Gustavo?
12	Soil P Testing for Agronomic Purposes papers		Mar 17	
13	Soil P Testing for Environmental Purposes PAE Ch 6 p145-180		Mar 22	
14	Soil P Testing for Environmental Purposes papers		Mar 24	
15	Agronomic Aspects of Fertilizer P Mgmt PAE Ch 22 p685-727		Mar 29	
16	Agronomic Aspects of Fertilizer P Mgmt papers		Mar 31	
17	Byproduct P Sources and Management PAE Ch 26 p829-879		Apr 5	Nick or Theresa?
18	Byproduct P Sources and Management papers		Apr 7	
19	Assessing the Risk of P Loss PAE Ch 30 p981-1020		Apr 12	
20	Assessing the Risk of P Loss papers		Apr 14	
21	Managing P for Environmental Protection PAE Ch 31 p1021-1068		Apr 19	
22	Managing P for Environmental Protection papers		Apr 21	
	* Phosphorus, Agriculture and the Environment			