GEL 5150 -- Soils and Soil Pollution

Spring-Summer 2017/Class meets Tuesday at 5:00-9:00pm -- 1171 Old Main Building
Section Number 30415 (4 credits) -- For general information: 313-577-2506
Instructor: Dr. Jeffrey L. Howard -- Office: 0224 Old Main (313-577-3258; jhoward@wayne.edu)
Office Hours: Tuesday 4:00-5:00 pm, or by appointment
On reserve at Undergrad Library: ²Soil Chemistry of Hazardous Waste by J. Dragun

COURSE SYLLABUS

Class Schedule

I. Soil Genesis, Morphology, Classification

A. Overview of weathering and pedogenic processes
B. Soil profile; soil physical properties
C. Soil water
D. Organic components
E. Soil organisms

F. Soil mineralogy
G. Soil chemistry
H. Soil classification and soil survey
I. Michigan soils; urban soils

Exam 1: June 6

F. Soil mineralogy
G. Soil chemistry
H. Soil classification and soil survey
I. Michigan soils; urban soils

Exam 2: July 11

II. Soil Pollution

A. Overview
B. Fate and mobility of heavy metals
C. Fate and mobility of organic compounds

Final Exam: Tuesday, Aug. 1, 5:00 pm, 1171 Old Main

Tentative Date for Field Trip: Saturday June 3 at 9 am (meet at Michigan State University farm, Meadowbrook and 12 Mile, Novi)
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General Course Description
This course is an elective for the B.S. and M.S. degrees in Geology, and is required for the B.S. degree in Environmental Science. Make-up exams require valid written excuse. No Incomplete ("I") grades are given according to departmental policy. Participation in the Saturday field trip is required.

Soil is an accumulation at the Earth's surface of organic matter and the mineral by-products of rock weathering. Soil not only provides the medium for most terrestrial and agricultural plant growth, it is often used as a construction material, and represents a valuable source of minerals and precious metals (e.g. aluminum). Unfortunately, soil is frequently the site of environmental pollution by trace elements and organic compounds. The purpose of this course is to synthesize basic concepts from Soil Science and Geology and provide an overview of a broad range of topics dealing with soils and environmental pollution. The first part of the course covers the basic aspects of soil morphology, genesis and classification. The second part examines the behavior of toxic trace elements and organic compounds in soil. It is anticipated that upon completion of this course you will be able to: a) read and interpret a soil profile description, b) understand the basic physical, chemical and mineralogical properties of soils, c) understand how soils are classified using Soil Taxonomy, and d) understand the nature and significance of heavy metal and organic soil pollution.

Lectures
It is the responsibility of students to attend classes regularly and punctually; to uphold academic honesty in all activities; to notify the instructor as early as possible if prevented from keeping an appointment or carrying out an assignment; and to adhere to the instructor's and general University policies on attendance, cheating, withdrawal, or other special procedures. It is a given that a student will attend class; no extra credit is given for attending lectures. It is the instructor's prerogative to take attendance. Attendance of less than 50% of lectures will result in an "F" grade. No laptops or cell phones can be used during lectures at any time. No photography of any course-related materials allowed. University closure due to severe weather: call 313-577-5345.

Examinations
The format and content of examinations are at the discretion of the instructor. In general, test questions are multiple choice, and true and false. Make-up exams can be taken, provided there is a valid written excuse for missing the scheduled exam, and the instructor is promptly notified. Exam dates will be verified one to two weeks in advance.

Grading
Exam 1: 25%; Exam 2: 25%; Final: 30%; Term Paper: 20%
NOTE: Attendance on field trip is mandatory. A grade of "I" is not given under any circumstances, according to departmental policy. Course grades are generally curved; the nature of the curve is at the discretion of the instructor. Cheating (using a "cheat sheet," looking at another's test, or allowing another to look at yours) will result in an "F" grade for course.

Religious holidays (from the online Academic Calendar)
Because of the extraordinary variety of religious affiliations of the University student body and staff, the Academic Calendar makes no provisions for religious holidays. However, it is University policy to respect the faith and religious obligations of the individual. Students with classes or examinations that conflict with their religious observances are expected to notify their instructors well in advance so that mutually agreeable alternatives may be worked out.
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Student Disabilities Services
If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 or 313-202-4216 (TTY: telecommunication device for the deaf, phone for hearing impaired students only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Also, you should contact the Laboratory Supervisor (Mr. Lowrie) as soon as possible. SDS’s mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University. Students who are registered with Student Disability Services and who are eligible for alternate testing accommodations such as extended test time and/or a distraction-reduced environment should present the required test permit to the professor at least one week in advance of the exam. Federal law requires that a student registered with SDS is entitled to the reasonable accommodations specified in the student’s accommodation letter, which might include allowing the student to take the final exam on a day different than the rest of the class.

Academic Dishonesty – Plagiarism, Cheating, etc.
Academic misbehavior means any activity that tends to compromise the academic integrity of the institution or subvert the education process. All forms of academic misbehavior are prohibited at Wayne State University, as outlined in the Student Code of Conduct (http://www.doso.wayne.edu/student-conduct-services.html). Students who commit or assist in committing dishonest acts are subject to downgrading (to a failing grade for the test, paper, or other course-related activity in question, or for the entire course) and/or additional sanctions as described in the Student Code of Conduct. Cheating: Intentionally using or attempting to use, or intentionally providing or attempting to provide, unauthorized materials, information or assistance in any academic exercise. Examples include: (a) copying from another student's test paper; (b) allowing another student to copy from a test paper; (c) using unauthorized material such as a "cheat sheet" during an exam. Fabrication: Intentional and unauthorized falsification of any information or citation. Examples include: (a) citation of information not taken from the source indicated; (b) listing sources in a bibliography not used in a research paper. Plagiarism: To take and use another’s words or ideas as one’s own. Examples include: (a) failure to use appropriate referencing when using the words or ideas of other persons; (b) altering the language, paraphrasing, omitting, rearranging, or forming new combinations of words in an attempt to make the thoughts of another appear as your own. Other forms of academic misbehavior include, but are not limited to: (a) unauthorized use of resources, or any attempt to limit another student’s access to educational resources, or any attempt to alter equipment so as to lead to an incorrect answer for subsequent users; (b) enlisting the assistance of a substitute in the taking of examinations; (c) violating course rules as defined in the course syllabus or other written information provided to the student; (d) selling, buying or stealing all or part of an un-administered test or answers to the test; (e) changing or altering a grade on a test or other academic grade records.

Course Drops and Withdrawals
In the first two weeks of the (full) term, students can drop this class and receive 100% tuition and course fee cancellation. After the end of the second week there is no tuition or fee cancellation. Students who wish to withdraw from the class can initiate a withdrawal request on Pipeline. You will receive a transcript notation of WP (passing), WF (failing), or WN (no graded work) at the time of withdrawal. No withdrawals can be initiated after the end of the tenth week. Students enrolled in the 10th week and beyond will receive a grade. Because withdrawing from courses may have negative academic and financial consequences, students considering course withdrawal should make sure they fully understand all the consequences before taking this step. More information on this can be found at: http://reg.wayne.edu/pdf-policies/students.pdf

Student services
The Academic Success Center (1600 Undergraduate Library) assists students with content in select courses and in strengthening study skills. Visit www.success.wayne.edu for schedules and information.
GUIDELINES FOR TERM PAPERS

I. Format

The paper should be at least 10 typed pages. Margins should be 1 inch (top, bottom, right) and 1-1/2 inches (left). The overall format should follow that found in recent issues of *Soil Science Society of America Journal*. You should have at least 10 different references, the majority of which are journal articles, not textbooks.

The article should have the following parts:

- Abstract
- Introduction
- Discussion
- Subheadings Have First Letters Capitalized
- Conclusions
- References Cited

The abstract should be no longer than 250 words. It should be as short as possible and read almost like a newspaper article, that is, most important points first and more trivial points last. You write this last because it summarizes, clearly and concisely, your major points and/or conclusions. Avoid statements like “the role of soil texture on site remediation is discussed”. Be specific. Say exactly what your conclusions are, for example, “soil texture controlled hydraulic conductivity and determined the effectiveness of site remediation”. The introduction sets the stage for your discussion. Normally you outline or define the problem you will be addressing. In a review article such as this you want to give an overview of the topics you will be discussing, that is, define the purpose and scope of your report. State why the topic you are discussing is important; what is its overall significance in soil science or hazardous waste management?

The discussion section is the main body of the paper. You should write from an outline and use topic headings. This section should be precisely referenced. The summary and conclusions should not be a reiteration of the abstract, but perhaps a more expanded version along with suggestions for future work. The reference section should follow the exact format found in *Soil Science Society of America Journal*, and of course, all references cited must be listed. Submit the original and retain a photocopy (or submit a good-quality photo copy). THE PAPERS WILL NOT BE RETURNED. Do not submit papers that discuss landfill liners or bioremediation unless they relate to soil. Remember that clay used in landfill liners is usually sedimentary in origin. It is NOT soil. *The papers are due Tues. July 25th, 5:30 pm.*

II. Possible Journals

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<th>Journal of Environmental Quality</th>
<th>Chemical Geology</th>
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<tr>
<td>Soil Science Society of America Journal</td>
<td>Environmental Science and Technology</td>
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<td>Journal of Water Pollution Control Federation</td>
<td>Water, Air and Soil Pollution</td>
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<td>Environmental Pollution</td>
<td>Journal of Soil Contamination</td>
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<td>Journal of Soil Science</td>
<td>Catena</td>
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II. Some possible Topics

- heavy metal contamination
- airborne deposition
- landfarming
- bioremediation
- sequential extraction analysis
- landfill leachates
- soil remediation
- any soil order
- petroleum contamination
- soil acidification
- contamination by organic chemicals
- trace metal speciation
- sampling strategies

I suggest that you select a topic of interest to you, for which there is abundant information, and run the topic by me before you start.