ENVS 3100K – Soil and Water Science

Spring 2021 – 4 credits

Professor: Dr. Dan Ferreira

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| **Class**: MWF 11:15 AM – 12:05 PM, CL-2008  **Lab:** W 12:20 – 3:05 PM, SC-245  **Office Hours**: By Appointment | **Office Location**: SC-339  **Phone**: (470)578-5011  **Email**: DFerreira@kennesaw.edu |

Arable soil and fresh water are critical resources necessary for our society to continue providing food for an ever expanding global population. *Between now and 2060 we will need to grow as much food as we have produced in the last 500 years combined*. However, almost 40,000 square miles of arable land are being lost each year and supplies of fresh irrigation water are dwindling all over the world. Understanding the fundamentals of soil and water science is the first step towards dealing with the challenges of food production in the 21st century.

**Student Learning Outcomes – By the end of the semester, you should be able to:**

* Know the basic terms for the description, study, and management of soils and water.
* Understand soil and water chemical and physical properties and processes important to soil and water quality.
* Develop skills in determining soil and water properties and interpreting information necessary for the productive use of soil and water.
* Understand the role of soil and water in maintaining and improving environmental quality.
* Be able to describe technologies and strategies for protecting the critical resources of arable soil and potable water.

**Textbook**

Option 1: Soil and Water Science by Brady. Published by Pearson, ISBN 9781269684149. Available in the bookstore.

Option 2: The Nature and Properties of Soils by Brady and Weil (14th/15th edition), published by Pearson -AND-

Applied Hydrogeology by C.W. Fetter (4th Edition), published by Pearson. Available online.

**Assessment Rubric (How I will grade exams and assignments)**

*Full credit* – The student has completely identified what the question is asking for and fully justified the answer he/she proposed. The justification is based in a solid understanding of the concepts covered in class.

*Partial credit* – The student has identified what the question is asking for and has proposed an answer. However, their answer is not fully backed up by the material learned in class, or the answer fails to take some important aspect of the question into account.

*No credit* – The student has not identified the specific issues presented in the question. The answer does not make sense or is not based in any way on the material learned in class.

**\*NOTE\***: If I cannot read your answer, you get **NO CREDIT**. Make sure your answers are legible.

**Covid-19 Statement**

The health and safety of my students is my number one concern. I want to give every student the best educational experience that I can while keeping everyone safe from the spread of Covid-19. If any student feels ill with symptoms of Covid-19 such as fever or coughing, please do not come to lecture or lab. If you have any symptoms of illness, please consult a medical professional and get tested for Covid-19. Failure to show up to lecture or lab due to illness will not result in any negative repercussions to your grade. All I ask is that you email me prior to your scheduled meeting time to let me know that you will be missing class or lab because you are sick.

As mandated by the University System of Georgia, the university requires the use of face masks in the classroom and in KSU buildingsto protect you, your classmates, and instructors.  Per the University System of Georgia, anyone not using a face covering when required will be asked to wear one or must leave the area. Repeated refusal to comply with the requirement may result in discipline through the applicable conduct code.

Reasonable accommodations may be made for those who are unable to wear a face covering for documented health reasons. Please contact Student Disability Services at sds@kennesaw.edu for student accommodation requests.

In order to allow for proper social distancing within the lab room, the lab will be split in such a way that no more than 12 students will attend any given lab session. In order to accomplish this, each lab will be taught over the course of two weeks. Half of the class will complete the lab during the first week and the other half will complete the lab during the second week. Lab reports will be due at the beginning of the next scheduled lab session.

**Course Norms:**

I want everyone to feel comfortable contributing their thoughts and ideas in lecture. In order to do that, we need to create an atmosphere of mutual respect between all members of the class. If you have questions about any of these policies or have special circumstances I should know about, please feel free to let me know.

*Makeup Assignments/Exams:* I will allow students to make up assignments or exams that they miss for legitimate reasons, BUT ONLY WITH APPROPRIATE DOCUMENTATION. If you do not have official documentation of your reason for missing class (a doctor’s note, a hospital discharge form, an official request to be excused from a coach, etc) you will receive a zero grade on any work you miss, including lab report that are not turned in by the due date. Documentation must be submitted within a reasonable (as determined by me) time period after the absence in order for the absence to be excused.

*Extra Credit*: There is **NO EXTRA CREDIT** in this class. The grade you receive will be calculated based on the criteria described below. If you wait until the last week of the semester to start worrying about your grade, I guarantee you that you will be disappointed.

*Electronic Devices (cell phones, PDAs, music players, etc.)*: Cell phones should be set to silent mode upon entering class. All other electronic devices must be turned off to maintain a respectful class atmosphere. You will be asked to leave if you disregard this requirement. If you wish to use a laptop in class, do not use the laptop for any purpose not related to the class (i.e. surfing the internet, playing games, etc). Such activities are distracting to everyone around you and seriously impact the ability of other students to learn. Repeated violations of this policy will result in you being banned from bringing a laptop to class in the future.

*Academic Honesty*: Every KSU student is responsible for upholding the provisions of the Student code of Conduct, as published in the Undergraduate and Graduate catalogs. The Student Code of Conduct addresses the University’s policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to University materials, misrepresentation/falsification of University records or academic malicious/intentional misuses of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the Student Conduct and Academic Integrity department, which includes either an “Informal” resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct’s minimum one semester suspension requirement. I don’t want to have to impose these penalties on anyone, and I know you don’t want to have them imposed on you either, so please make things easier on both of us and just don’t cheat.

*Accommodations:* Any student with a documented disability or medical condition needing academic accommodations of class-related activities or schedules must contact the instructor immediately. Written verification from the KSU Student Disability Services (http://www.kennesaw.edu/stu\_dev/dsss/welcome.html) is required. No requirements exist that accommodations be made prior to completion of this approved University documentation. All discussions will remain confidential.Course requirements will not be waived, but accommodations will be made, when appropriate, to assist you to meet the requirements.

**Grading**

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| Quizzes - 5%  Lab – 20%  Exams – 15% each (60% total)  Final Exam – 15% | A  B  C  D  F | = 90 - 100  = 80 - 89  = 70 - 79  = 60 - 69  = 59 and below |

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| **Important Dates** |  |
| 1/15: Last day to add/drop  1/18: Martin Luther King holiday | 3/8 – 3/14: Spring Break  5/3: Last Day of classes |
| 3/3: Last day to withdraw | 5/3: Final Exam |
| **In-Person Attendance Schedule (listed group is in person, alternate group is remote)** | |

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| **January** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11 (M) | 13 (W) | 15 (F) | 18 (M) | 20 (W) | 22 (F) | 25 (M) | 27 (W) | 29 (F) |  |  |  |  |  |
| Group 1 | Group 2 | Group 1 | Group 2 | Group 1 | Group 2 | Group 1 | Group 2 | **EXAM 1** |  |  |  |  |  |
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| **February** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 (M) | 3 (W) | 5 (F) | 8 (M) | 10 (W) | 12 (F) | 15 (M) | 17 (W) | 19 (F) | 22 (M) | 24 (W) | 26 (F) |  |  |
| Group 1 | Group 2 | Group 1 | Group 2 | Group 1 | Group 2 | Group 1 | **EXAM 2** | Group 2 | Group 1 | Group 2 | Group 1 |  |  |
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| **March** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 (M) | 3 (W) | 5 (F) | 8 (M) | 10 (W) | 12 (F) | 15 (M) | 17 (W) | 19 (F) | 22 (M) | 24 (W) | 26 (F) | 29 (M) | 31 (W) |
| Group 2 | Group 1 | Group 2 | Group 1 | Group 2 | Group 1 | Group 2 | **EXAM 3** | Group 1 | Group 2 | Group 1 | Group 2 | Group 1 | Group 2 |
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| **April** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 (F) | 5 (M) | 7 (W) | 9 (F) | 12 (M) | 14 (W) | 16 (F) | 19 (M) | 21 (W) | 23 (F) | 26 (M) | 28 (W) | 30 (F) |  |
| Group 1 | Group 2 | Group 1 | Group 2 | **Exam 4** | Group 1 | Group 2 | Group 1 | Group 2 | Group 1 | Group 2 | Group 1 | Group 2 |  |

*Note: All exams will be given on D2L. During days marked as Exam days, both groups will be remote.*

**Course Outline (This schedule is subject to change as the semester progresses)**

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| **Week of** | **Topic** | **Background Reading** |
| 1/11 | Intro to Soils & Soil Formation | NPS: Ch 1-2 |
| 1/18\* | Structural and Physical Properties of Soils | NPS Ch 4 |
| 1/25 | Storage and Movement of Water in Soils, **Exam 1** | NPS Ch 5 |
| 2/1 | Soil Chemistry, Behavior of Clays, Soil Acidity | NPS Ch 8 |
| 2/8 | Ionic Effects on Soils, Organismal Ecology, Decomp. of SOM | NPS Ch 9&11 |
| 2/15 | SOM Transformations, Nitrogen Part 1 *(not on Exam 2)*, **Exam 2** | NPS Ch 12 |
| 2/22 | Nitrogen Part 2, Sulfur, Phosphorus | NPS Ch 13 |
| 3/1 | Potassium, Calcium/Magnesium, Fertilizer Requirements | NPS Ch 14 |
| 3/8\* | SPRING BREAK – NO CLASSES |  |
| 3/15 | Micronutrients in Soils, Water Resources (*not on Exam 3*), **Exam 3** | NPS Ch 15 |
| 3/22 | Introduction to Groundwater Hydrology, Precipitation, Water Cycle | Fet Ch 1 |
| 3/29 | Groundwater Cycling & Recharge, Pumping GW, Aquifers | Fet Ch 2&3 |
| 4/5 | Aquifer Dynamics, GW Flow, **Exam 4** | Fet Ch 4 |
| 4/12 | Hydraulic Head, Well Pumping & Testing | Fet Ch 5 |
| 4/19 | GW Quality, Contaminant Delineation, Classes of Contamination | Fet Ch 10 |
| 4/26 | Groundwater Remediation, Aquifer Protection, Water Budgets | Fet Ch 11 |
| 5/3 | **Exam 5 (Final Exam)** | Fet Ch 11 |

\* indicates a week where one or more classes will not take place due to a holiday.

**Lab Schedule (This schedule is subject to change as the semester progresses)**

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| 1/20 | 2.Soil Color and Textural Classification (Group 1) | 3/10 | SPRING BREAK |
| 1/27 | 2.Soil Color and Textural Classification (Group 2) | 3/17 | 9. Groundwater Field Skills (Group 1) |
| 2/3 | 3.Cation Exchange Capacity (Group 1) | 3/24 | 9. Groundwater Field Skills (Group 2) |
| 2/10 | 3.Cation Exchange Capacity (Group 2) | 3/31 | 10. Characterizing GW Flow (Group 1) |
| 2/17 | 5. Measuring Soil O.M.% / Diagnosing Nutrient Deficiency (Group 1) | 4/7 | 10. Characterizing GW Flow (Group 2) |
| 2/24 | 5. Measuring Soil O.M.% / Diagnosing Nutrient Deficiency (Group 2) | 4/14 | 11. Slug Test (Group 1) |
| 2/26 | KSU Farm Field Trip (Group 1) | 4/21 | 11. Slug Test (Group 2) |
| 3/3 | KSU Farm Field Trip (Group 2) | 4/28 | **NO LAB** |