Geology 506 and EVPP 505 - Soil Science
SPRING 2020

PREREQUISITE	GEOL 101 and CHEM 103 or 211
CLASS MEETS	Tuesday 4:30 p.m. to 7:10 p.m. - Exploratory 1309
INSTRUCTOR	Dr. Julia Nord, 3453 Exploratory Hall Email Address - jnord@gmu.edu
OFFICE HOURS	Tuesday 1:00 p.m - 2:00 p.m. and 7:15 p.m. to 8:00 p.m. and by appointment
TEXT	Selected Readings will be assigned. There is no class textbook for this class. **FOR FIELD WORK** Field Book for Describing and Sampling Soils, Version 3.0 U.S. GOVERNMENT BOOKSTORE. For the USDA Pamunkey Soil https://soilseries.sc.egov.usda.gov/OSD_Docs/P/PAMUNKEY.html Web Soil Survey https://http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm
EXAMS	Make-up exams will only be allowed in exceptional and documented circumstances.
MULTITASKING	Recent research shows that humans are not good at multitasking, in fact several peer reviwed journals state that "multitasking results in poorer learning and poorer performance". Please refrain from using phones and computers for text messages, Facebook, internet searching, shopping, IM and other related activities. IF we do not know the answer to a question as a group we can look it up during the break and have a discussion. If you use a computer for note taking please do not use it for other purposes. IF you still want to multitask please sit on the back row, or where no-one else can see your screen. In-class multitasking and academic performance Computers in Human Behavior (2012) Multitasking in the University Classroom. International Journal for the Scholarship of Teaching and Learning Vol. 6, No. 2 (July 2012)

	Students are Better Off without a Laptop in the Classroom Scientific American July 2017
ACADEMIC INTEGRITY	Mason is an Honor Code university; please see the Office for Academic Integrity for a full description of the code and the honor committee process. HONOR CODE. Some key parts paraphrased from Mason's Honor code and the Center for Teaching and Faculty Excellence The integrity of the University community is affected by the individual choices made by each of us. Mason's Honor Code has clear guidelines regarding academic integrity. There are three fundamental principles to follow at all times: (1) all work submitted must be your own; (2) when using the work or ideas of others, including fellow students, give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment, ask for clarification. Plagiarism means using the exact words, opinions, or factual information from another person without giving the person credit. Writers give credit through accepted documentation styles, such as parenthetical citation, footnotes, or endnotes. Paraphrased material must also be cited, using MLA, APA or discipline based format. A number of projects in this class are designed to be completed within your study group. With collaborative work, names of all the participants should appear on the work. Collaborative projects may be divided up so that individual group members complete portions of the whole, provided that group members take sufficient steps to ensure that the pieces conceptually fit together in the end product. Some projects are designed to be undertaken independently. You are responsible for making certain that there is no question that the work you hand in is your own. If only your name appears on an assignment, your professor has the right to expect that you have done the work yourself, fully and independently. http://ctfe.gmu.edu/teaching/designing-your-syllabus/
DISABILITY ACCOMMODATIONS	If you have a documented learning disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with Office of Disability Services (SUB I, Rm. 4205; 993-2474;http://ods.gmu.edu) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

BASIC NEEDS ACCOMMODATIONS	It can be challenging to do your best in class if you have trouble meeting basic needs like safe shelter, sleep, and nutrition. If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live, I urge you to contact Student Support and Advocacy Center at 703.993.3686 and https://ulife.gmu.edu/get-help/pop-up-pantry/
RECORDING OF LECTURES	If you would like to do this please let me know and sign the appropriate form. PLEASE NOTE: The opinions I express in this class are not necessarily the ones I personally hold. I may make statements to elicit a response. The opinions of other class members must not be played back to anyone outside of the classroom
Students as Scholars Inquiry-level course	"Students will articulate a scholarly question; engage in the key elements of the scholarly process; and situate the concepts, practices, or results of scholarship within a broader context." This course is designed to introduce you to academic-level scholarly inquiry, and give you some of the the skills to ask good research questions **and** find the resources to answer those questions. Scholarly Inquiry courses must address both of the following elements: 1. Articulate and refine a scholarly question. 2. Follow ethical principles. And, address at least one of the following elements: 3a. Choose an appropriate discovery process for scholarly inquiry. 3b. Gather evidence appropriate to the question. 3c. Apply appropriate scholarly conventions during scholarly inquiry. 3d. Apply appropriate scholarly conventions when reporting or performing. And, address at least one of the following elements: 4a. Assess the validity of key assumptions and evidence. 4b. Situate the scholarly inquiry within a broader context. http://oscar.gmu.edu/fac-staff/Discovery-and-Inquiry-Courses.cfm
Course Goals:	provide an introduction to the physical, chemical, and biotic properties of soils. discuss issues relating to soil quality, soil stewardship, and the problems of providing food for our growing population. Soils are becoming a scarce resource.

	understand how soils form and support life. Without soil, the earth's surface would be barren rock or sand, silt, clay and gravel. Soil is a biologically active zone where sunlight, water, the atmosphere, and living things mix and interact with the Earth's rocks and minerals. understand the complexity of soils. Soil is constantly altering its composition in response to changing conditions. It supports a host of interdependent communities of living things which survive by endlessly exchanging energy and chemical resources (minerals, elements, nutrients etc). Work with the USDA soil classification scheme, including soil mapping, and how soil is used as a resource for agriculture, building sites, landfills, septic systems, and water (quality, availability and movement). Be able to read and understand USDA profile descriptions. A knowledge of soils is necessary for site assessment, urban and regional planning, and pollution mitigation. Describe a soil profile in the field using the correct protocols. appreciate that poor soil stewardship resulted in the demise of many civilizations - and it is still uncertain how well soils will be able to support a growing, hungry population, now over 7.7 billion. The generation of dust from soil erosion is linked to increased cases of human disease, coral death, red tides, drought, and the end of the Ice Age. Dust is even implicated in the demise of the dinosaurs. Soil interactions are also very important in the investigation of long-term Global Climate change.
Your Goals	Take some time over the next week to write your goals here. . . .
My peers	Write down contact information for 2 of your fellow students **here**. . . .

COURSE SCHEDULE

DATE	TOPICS	READINGS / ASSIGNMENTS
Jan. 21 Tuesday Week 1	What is soil? Four constituents of soil - water, air, minerals (all non-organic) and life (organic) Soils and their uses. Syllabus. Pamunkey Soil 4 soil forming processes Soil Taxonony #1 Overview of the 12 soil orders	What is soil? https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054280 Soil Processes. https://processes.soilweb.ca/soil-processes/ To understand the range of disciplines intertwined with soil science look at these 2 sites http://en.wikipedia.org/wiki/Soil_science REMEMBER - Wiki is NOT peer reviewed. However this is a pretty good summary and I have checked it. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054277" **A good soil (a good summary)** on BB site. This will be complex now. You will be able to read more and more of this summary as you learn over this semester.
Jan. 28 Tuesday Week 2	introduction to the 5 soil forming factors.CLORPT **CL**imate **O**rganics **R**elief (topography) **P**arental Material **T**ime	5 soil forming factors. Factors Affecting Soil Development Soil Formation and Classification Your Physical Geology textbook and notes

	Parental Material (rock cycle, igneous, sedimentary and metamorphic rocks). Weathering **Assignment #1 Weathering**	
Feb. 4 Tuesday Week 3 Literature Assignment - Choose Topic Format of Paper DUE: April 7th, beginning of class	Products of Weathering Clay minerals, soil colloids, Cation Exchange Capacity (CEC) **Assignment #2 Cation Exchange Capacity**	https://www.srs.fs.usda.gov/pubs/ja/ja_barton002.pdf http://www.soilquality.org.au/factsheets/cation-exchange-capacity Cation Exchange
Feb. 11 Tuesday Week 4	Soil formation. Soil profile. O, A, E, B, C, R Introduction to the physical	https://www.youtube.com/watch?v=mg7XSjcnZQM https://www.soils.org/discover-soils/soil-basics/what-makes-soil-soil https://www.nrcs.usda.gov/wps/portal/nrcs/detail/nj/home/?cid=nrcs141p2_018993

	properties of soils. **Assignment #3 Texture, Color etc.**	
Feb 18 Tuesday Week 5	Soils aeration and temperature Soils and Climate Soil Taxonony #2 More detail of the 12 soil orders. **Assignment #4 Taxonomy**	Soils and Climate Climate - Soils USDA soil taxonomy The Twelve Orders of Soil Taxonomy
Feb. 25 Tuesday Week 6 **Dylan Persinger & Shannon Glock**	**TEST 1** 6:00 Hands on with soils	After test: 6:00 Hands on working with physical properties of soils. Reading: **A good soil (a good summary)** on BB site.
March 3 Tuesday Week 7 **Dr. Jules Goldspiel**	Hydrological Cycle Soil water Soil solution and plants.	**Guest lecture.** Krystina Scott, Soil Consultants Engineering: "Importance of Soils in the Industry and Professional Careers in the Soil Sciences" Soil and Water FAO (Food and Agriculture Organization of the United Nations) Cohesion and adhesion of water

	Chemical processes - leaching, oxidation etc **Class assignment #5. Water movement in soils**	
Mar. 10 Tuesday	**Spring Break**	
March 17 Tuesday Week 8	Soil Morphology. Soil Taxonomy #3 Carbon Cycle. Soil organic matter (SOM) **Class assignment #6 Organic Material**	Group projects discussed
SATURDAY March 21st Algonkian Park field trip 9:00 a.m. - 2:00 p.m. OR	A Describing soils in the field. Algonkian Park by the Potomac River Directions	**You MUST attend to prepare for your final project**

SUNDAY March 22nd Algonkian Park field trip 12:00 noon - 5:00 p.m.		
March 24 Tuesday Week 9	Soil organic matter (SOM) - Organisms and their residues Nitrogen Cycle **Class assignment #7 Detailed soil descriptions**	Group projects assigned
March 31 Tuesday Week 10	**4:30 - 6:15 TEST 2** Movie: Hope in a Changing Climate	
April 6th OR April 7th **SATURDAY OR SUNDAY**	**Group Project - Data Collection** Describing soils in the field at Environmental Studies on the	

	Piedmont Environmental Studies on the Piedmont	
April 7 Tuesday Week 11	Time to work on project in class. Summarize animal / crop needs. Find a method - agreed by all - to present the soil profile and data.	
April 14 Tuesday Week 12	Nutrients Macro elements. Sulfur, Phosphorous and Potassium. Micronutrients and nutrient management.	TBD
April 21 Tuesday Week 13	Presentations	

	Project paper due in class today	
April 28 Tuesday Week 14	Soils and erosion	TBD
May 5 Tuesday	Reading Day	
May 12 Tuesday	**Final Exam** Same time, same place. NOTE: week break for Reading Day	

GRADING	
Test 1	15%
Test 2	15%
Final Exam	20%
Group Project & Presentations	15%
7 assignments	21%
Literature Assignment	15%
Field Trips	4% You must attend the field trip as preparation for the final project You must participate in a final project

	Occasionally the final project has been done at a different time - if - all team members agree