

Spatial Variability in Soils

AGRO 831

Spring 2024 (2 credits)

Course Syllabus

Description. This course examines concepts of soil spatial variability – the underlying causes of soil variability and impacts soil variability can have on management, primarily for crop production. Students will become familiar with geographic and geostatistical concepts used in describing and measuring spatial variability. They will learn how to access and use information sources about soil spatial variability, as well as how to create spatial data themselves. Students will also be introduced to approaches on the use of spatial information for more profitable crop production.



The course requires as pre-requisites AGRO 366 (Soil Nutrient Relationships) and STAT 801 (Statistical Methods in Research), or permission from the instructors.

- Be able to identify sources and scales of soil variation.
- Evaluate when variability is manageable and when it is not.
- Be able to identify and used both public and self-generated spatial information resources.
- Be able to use GIS to summarize and analyze data.
- Abilit to collect data and analyze it to quantify variability.

Instructor:

Richard Ferguson, Professor, Department of Agronomy and Horticulture
rferguson1@unl.edu

Grading. You will be graded on bi-weekly homework assignments given in Canvas. Four assignments will be given, starting Feb. 12, collectively worth 60 points. You will complete a paper over a spatial soils topic of interest to you, with instructor consultation, worth 40 points. Your grade will be based on 100 total points. The letter grade will be assigned using the following scale:

96 - 100: A+	92 - 95: A	88 - 91: A-	
84 - 87: B+	81 - 83: B	78 - 80: B-	
74 - 77: C+	70 - 73: C	67 - 69: C-	
64 - 66: D+	60 - 63: D	57 - 59: D-	<57: F

Course Schedule:

Lectures will be available for review on the course Canvas site beginning Monday, February 12.

Assignments

Assignment	Topic	Post Date	Due Date	% of Course Grade
1	Sources & Scales of Variability	Feb. 12	Feb. 26	10
2	Sources of Spatial Information	Feb. 28	Mar. 13	15
3	Quantifying Spatial Variability	Mar. 14	Mar. 29	20
4	Spatial Analysis Tools & Profit	Apr. 1	Apr. 17	15
Paper	Consult Instructor on Topic	Apr. 8	May 1	40

Resources.

M. J. Mausbach, L. P. Wilding, editors, 1991. Spatial Variabilities of Soils and Landforms. SSSA Spec. Publ. 28. SSSA, Madison, WI. doi: 10.2136/sssaspecpub28.frontmatter.

Mulla D.J. (2016) Spatial Variability in Precision Agriculture. In: Shekhar S., Xiong H., Zhou X. (eds) Encyclopedia of GIS. Springer, Cham (<https://link.springer.com/referencework/10.1007/978-3-319-23519-6>)

D.K. Shannon, D.E. Clay, N.R. Kitchen, editors, 2018. Precision Agriculture Basics. ASA, CSSA, and SSSA, Madison, WI. doi:10.2134/precisionagbasics.2018.frontmatter (<https://dl.sciencesocieties.org/publications/books/tocs/acesspublicati/precisionagbasics>)

D.K. Shannon, D.E. Clay, N.R. Kitchen, editors, 2018. Precision Agriculture Basics. ASA, CSSA, and SSSA, Madison, WI. doi:10.2134/precisionagbasics.2018.frontmatter (<https://dl.sciencesocieties.org/publications/books/tocs/acesspublicati/practicalmath>)

Academic Honesty. The Code of Conduct published in the UNL Student Handbook concerning academic honesty applies. Students are expected to adhere to guidelines concerning academic dishonesty outlined in Section 4.2 of the University's Student Code of Conduct (<http://stuafs.unl.edu/ja/code/>). Supplemental information is available at: https://agronomy.unl.edu/c/document_library/get_file?uuid=784d9094-d5e1-4457-86a7-a0a596bb1009&groupId=4128273&.pdf

Students are encouraged to contact the instructor for clarification of these guidelines if they have questions or concerns.

Students with Disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3787 voice or TTY.

Emergency Response

Fire Alarm (or other evacuation): In the event of a fire alarm: Gather belongings (Purse, keys, cellphone, N-Card, etc.) and use the nearest exit to leave the building. Do not use the elevators. After exiting notify emergency personnel of the location of persons unable to exit the building. Do not return to building unless told to do so by emergency personnel.

Tornado Warning: When sirens sound, move to the lowest interior area of building or designated shelter. Stay away from windows and stay near an inside wall when possible.

Active Shooter

Evacuate: if there is a safe escape path, leave belongings behind, keep hands visible and follow police officer instructions.

Hide out: If evacuation is impossible secure yourself in your space by turning out lights, closing blinds and barricading doors if possible.

Take action: As a last resort, and only when your life is in imminent danger, attempt to disrupt and/or incapacitate the active shooter.

UNL Alert: Notifications about serious incidents on campus are sent via text message, email, unl.edu website, and social media. For more information go to: <http://unlalert.unl.edu>.

Additional Emergency Procedures can be found here:

http://emergency.unl.edu/doc/Emergency_Procedures_Quicklist.pdf