

SYLLABUS
Geographic Information Systems in Agriculture

Fall Semester 2018

Course Number SOCR 377
3 Credit Hours

I.

A. Instructor:

Raj Khosla

Soil and Crop Sciences
Office: C013 Plant Science Building
Phone office: 970-491-1920

Email: raj.khosla@colostate.edu Email is one of the most convenient ways of communicating with me. I usually check my email several times a day.

Office Hours: Any time the door is open or the light is on. Alternatively, you can schedule a time with me to ensure I am available to meet with you at your desired time.

B. Teaching Assistant:

Evan Phillippi
W010 Plant Sciences Building
Soil & Crop Sciences
Phone office: 491-6237
Email: Evan.Phillippi@rams.colostate.edu

Office hrs: Wednesday 10am to 12noon

II. Course Schedule:

A. **Lecture:** Tues. and Thurs. **12:30 pm** through **1:45pm**. Room #105 Military Sciences Building. (Alternate arrangements: Please note, some of the class lectures may be re-scheduled to another day and time if necessary for reasons including but not limited to: inclement weather, instructor's travel, or other scheduling reasons)

B. Laboratory: Scheduled for Thursdays 2:00 through 4:40pm.

Room: W-10 Precision Agriculture - GIS Lab in Plant Sciences Bldg;

Room: Learning Studio B302 NSEB Building.

[You will be informed promptly where we will meet for which lab.]

For your lab project and home-works, you may work in my Precision Ag/ GIS Lab located in W-10 Plant Sciences Building. It is open from 10am to 12noon and from 1:00pm to 2:00pm and you are welcome to complete your homework in the lab., during these hours. [It is encouraged to send an email to your TA, Evan to ensure he keeps the lab open for you]

(Alternate arrangements: Please note, some of the class-labs may be re-scheduled to another day and time if necessary for reasons including but not limited to: inclement weather, instructor's travel, or other scheduling reasons)

C. Field trip: Aug 30, Sep 6th, 20th, 27th, and Oct 18th

D. Midterm Exams: September 11th and October 4th.

E. Final Examination: Thursday October 30th (Time: 12:30pm to 1:45pm)

III. Course Objectives:

Upon completion of this course, students will be able to:

1. Understand the principles and elements of Global Positioning systems (GPS)
2. Identify the errors associated with GPS systems
3. Understand the concepts and functioning of Differential Global Positioning Systems (DGPS)
4. Understand the concept of spatial variability
5. Realize the scope of precision farming and know the precision farming cycle
6. Understand the potential benefits of precision agriculture
7. Perform real-time field mapping and grid soil sampling
8. Understand variable rate nutrient and other agri-chemical digital application.
9. Monitor and map yield data and post processing of the yield maps
10. Work with precision farming hardware and software.

IV. Course Grading:

A. Midterm examination:	35 percent (15 + 20)
B. Home work Problems	15 percent
C. In class and take home lab assignments:	15 percent
D. Final lab project:	15 percent
E. Final Exam (Comprehensive):	20 percent

V. Recommended Text book:

The Precision Agriculture Basics Book, ASA Publications.

The Precision-Farming Guide for Agriculturists: Editor John E. Kuhar. Published by Deere & Company, Moline, IL.

Other books, research papers and reading material will be reserved in the library or my lab for you to check out and do the assignments.

VI. Library Help:

Rena Watson is the librarian supporting this course. Contact her for assistance at renae.watson@colostate.edu / ph. 970-491-5338. See her research guide at libguides.colostate.edu/agriculture. Additionally, the CSU Libraries Help Desk provides both research (ph. 970-491-1841) and technical (ph. 970-491-7276) support. These services are free for all CSU students and can be extremely helpful as you prepare your final project.

SOCR 377 GIS IN AGRICULTURE LECTURE

Tue, Th 12:30 pm through 1:45 pm

Room: Military Sciences # 105

Date	Lecture No.	Description	Instructor
08/21/18	1	Overview and Syllabus	Khosla
<u>08/23/18</u>	2	Units & Conversion ratios Intro to Global Positioning Systems	”
08/28/18	3	Elements of GPS, Principle of GPS	”
<u>08/30/18</u>	4	Errors in GPS systems	”
09/04/18	5	Differential GPS	”
<u>09/06/18</u>	6	Geographic Information Systems	Phillippi
09/11/18	7	Midterm I	”
<u>09/13/18</u>	8	Midterm Review & Concept of Variability	Khosla
09/18/18	9	Characterizing, Understanding and Managing Variability in farm fields	”
<u>09/20/18</u>	10	Precision Auto Guidance Systems & Remote Sensing	Phillippi
09/25/18	11	Remote Sensing contd... Sensors	Khosla
<u>09/27/18</u>	12	Management Zones and Precision Crop Management	”
10/02/18	13	Yield Monitoring and Mapping	”
<u>10/04/18</u>	14	Midterm II	Phillippi
10/09/18	15	Midterm II Review & Yield Mapping continued	Khosla
<u>10/11/18</u>	16	Spatial Statistics in Precision Ag.	Flynn
10/16/18	17	Industry Guest Lecture: ISOBUS Application Control	Trimble
<u>10/18/18</u>	18	Precision Irrigation	Khosla
10/23/18	19	Industry Guest Lecture	TBA
<u>10/25/18</u>	20	Holistic Concepts in Precision Management	Khosla
10/30/18	21	FINAL EXAM	”

SOCR 377 GIS IN AGRICULTURE LABORATORY
 Thursday 2:00pm through 4:40pm
Precision Ag Lab Rm W-10 Plant Sciences Bldg
Alternate: Learning Studio B302 NSEB Building
CSU-ARDEC (Agricultural Research and Development Education Center)

Date	Lab. No.	Description	Place	Instructor
08/23/18	1	Intro to GPS receivers and peripherals & Intro to Mapping platform FarmGPS and Grid Sampler	Lab W010 Plant Sci	Khosla
08/30/18	2	Measuring accuracy of GPS receiver in field, hands-on field mapping of Monfort Quad, south of Plant Sci bldg.	Field	Khosla/ Phillippi
09/06/18	3	Real time mapping, Grid Sampling	Field	Phillippi
09/13/18	4	Spatial Editing of GIS data sets, & Geo-coding and Interpolation	W010 Plant Sci	Khosla/ Phillippi
09/20/18	5	[Trimble] Precision Auto-Guidance Systems	Field	Phillippi
09/27/18	6	Crop Canopy Sensing and Management	Field	Khosla/ Phillippi
10/04/18	7	Yield Monitoring Systems Farm HMS & Interpreting Yield Monitor Data	W010 Plant Sci	Khosla/ Phillippi
10/11/18	8	Prepare Final Project Report and Presentation Slides	W010 Plant Sci	Khosla/ Phillippi
10/18/18	9	Visit to Fagerberg Farm	Field	”
10/25/18	10	Final Project Presentation & Report Due	W010 Plant Sci	Students

SOCR 377
GIS in Agriculture
Resubmission Privilege for Home-works

Ground rules:

1. All homework submissions must be done neatly, clearly, in a timely manner, with your name written on the submitted homework.
2. You are welcome to “re-submit” your graded homework “re-doing” the portion where you missed points, as many times as you may wish till you earn a full grade or desirable grade.
3. You must complete your home-work in entirety, i.e., attempt all questions completely. [Failure to complete your home-work in entirety will result in forfeiture of your “resubmission” privilege for that particular homework.]
4. You must provide the previously graded home-work along with your corrected re-submission, with clearly labelled questions.
5. Your re-submission of “corrected” homework must occur at the next meeting. For e.g.: You received your graded home-work back on Tues Aug 21st and missed 12 points. To take advantage of your re-submission privilege, you must correct the missed questions and resubmit that to me at the next class-meeting i.e., on Thurs Aug 23rd.

Other Pertinent Information

This course will adhere to the Academic Integrity Policy {Section 1.6} of the Colorado State University General Catalog, the Student Conduct Code, and University Principles of Community.

Please refer to The University Principles of Community found on page 7 of this syllabus.

Please refer to our cheating and plagiarism policy found on the Canvas homepage and page 7 of this syllabus.

Student Conduct Code: <http://www.conflictresolution.colostate.edu/conduct-code.aspx#conduct>

Colorado State University General Catalog: <http://www.catalog.colostate.edu/>

Principles of Community

In this course we strive to follow and extend Colorado State's University's Principles of Community, and welcome spirited discussion, lively debate and pursuit of knowledge in a manner that respects each of us as individuals.

The Principles of Community support the Colorado State University mission and vision of access, research, teaching, service and engagement. A collaborative and vibrant community is a foundation for learning, critical inquiry, and discovery. Therefore, each member of the CSU community has a responsibility to uphold these principles when engaging with one another and acting on behalf of the University.

Inclusion: We create and nurture inclusive environments and welcome, value and affirm all members of our community, including their various identities, skills, ideas, talents and contributions.

Integrity: We are accountable for our actions and will act ethically and honestly in all our interactions.

Respect: We honor the inherent dignity of all people within an environment where we are committed to freedom of expression, critical discourse, and the advancement of knowledge.

Service: We are responsible, individually and collectively, to give of our time, talents, and resources to promote the well-being of each other and the development of our local, regional, and global communities.

Social Justice: We have the right to be treated and the responsibility to treat others with fairness and equity, the duty to challenge prejudice, and to uphold the laws, policies and procedures that promote justice in all respects.

Plagiarism and Academic Integrity

We take the issue of academic integrity very seriously in this course. You are expected to do your own work and to not access notes or the web during an exam, copy from someone else's exam or to provide exam answers to another student during an exam. We reserve the right to proctor all exams and will take actions to ensure that all students are following this policy.

Plagiarism

"Plagiarism includes the copying of language, structure, ideas, or thoughts of another, and representing them as one's own without proper acknowledgment. Examples include a submission of purchased research papers as one's own work; paraphrasing and/or quoting material without properly documenting the source" (CSU Policies and Guiding Principles, 2017-2018).

Our motivation for rigorously enforcing a no-plagiarism policy is twofold: First, plagiarism is a form of theft. Taking someone else's words or ideas without attribution is stealing someone else's work. Second, copying someone else's work does not fulfill the purpose of the assignment, which is for you to develop critical thinking and analysis skills. You demonstrate this by presenting your own, new, synthesis and analysis in your writing. Simply copying or paraphrasing from source materials does not demonstrate this, however insightful the source(s) may be. Good writing generates new knowledge. This should be your goal in this class, in other courses at CSU and in your career after you leave here.

In this course all written work will be spot checked for plagiarism issues by both instructors and originality checking software such as VeriCite. If you are caught plagiarizing materials you will receive a 0 for the assignment/exam/project, and depending upon the severity of the offense, an F in the course. All examples of plagiarism or academic dishonesty and will be reported to the Office of Conflict Resolution and Student Conduct Services for additional disciplinary action as outlined in the student handbook under the heading "academic integrity/Misconduct" (<http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/>).