

Geography 587/9: Digital Image Analysis and Modeling/GIS Laboratory Fall 2021 Syllabus

Instructor:

Instructor: Dr. Anna Klene

Office: Stone Hall 216

Email: anna.klene@umontana.edu

Office hours: Thurs 3:30-5 pm on Zoom & appt

Course objectives:

To extend knowledge & technical skills in using raster-based GIS & remotely sensed imagery as a tool in environmental analysis by looking at a sampling of advanced techniques, & to provide a forum for student research conducting in a problem-solving group setting. **Lab is required.**

Prerequisites:

A working knowledge of GIS and either Geog487/9 or another introduction to remote sensing course. ArcGIS, TerrSet, and several other software will also be used during the course

Tentative Course Outline:

| Week | Tuesday Lab | Thursday Lecture | Lab Due |
|------|--|--|------------|
| 1 | 31 – Introduction & Orientation TerrSet Tutorial | 2 – Image Corrections & PCA | Not Graded |
| 2 | 7 – Lab 1: TerrSet Image Correction | 9 – Veg Indices & Hyperspectral Imagery | |
| 3 | 14 – Lab 2: Hyperspectral | 13 – Machine Learning Classifications | Lab 1 |
| 4 | 21 – Lab 3: Decision-Tree Classifications | 20 – Modeling Principles Prospectus Due | Lab 2 |
| 5 | 28 – Lab 4: RandomForest Classification | 27 – Modeling, MCE, & Logistic Regression | Lab 3 |
| 6 | 5 – Lab 5: Multi-Criteria Evaluation | 4 – Modeling & Model Evaluation Stats | Lab 4 |
| 7 | 12 – Lab 6: Logistic Regression & Stats | 11 – Modeling Land-Cover & Time-Series | |
| 8 | 19 – Lab 7: Land-Change Modeler | 18 – Modeling & Veg Wrap Up | Lab 5 |
| 9 | 26 – LCM Week 2 | 25 – UAVs & Soft Photogrammetry | Lab 6 |
| 10 | 2 – Lab 8: UAV Lab Election Day. Please Vote! | 1 – LiDAR | Lab 7 |
| 11 | 9 – Lab 9: LiDAR Lab | 11 – Veteran’s Day Holiday | |
| 12 | 16 – Labs & Student Projects | 18 – Table & Graphing Principles | Lab 8 |
| 13 | 23 – Labs & Student Projects | 25 – Thanksgiving – No Classes | |
| 14 | 30 – Table/Graphing Assignment Due & Presentations; & Exam | Dec. 2 – Student Projects | Lab 9 |
| 15 | 7 – Final Student Presentations | 9 – Final Student Presentations *Student Papers due Friday by 5pm* | |
| Exam | Exam Week | Exam time is Wed., Dec. 15: 3:20-5:20 | |

Important Dates:

Sept. 20: Last day to drop/add in Cyberbear with partial refund or change to “Audit”.

Nov. 1: Last day to drop w/ drop/add link in Cyberbear (w/ prof & advisor sigs), \$10 fee, and “W” grade.

Dec. 10: Last day to drop w/ drop/add link (w/ prof, advisor, & dean sigs), \$10 fee, and “WP” or “WF” grade.

Geography 587/9: Digital Image Analysis and Modeling/GIS Laboratory

Fall 2021 Syllabus

Coronavirus:

Please refer to <https://www.umn.edu/coronavirus/default.php> for the latest information, policies on masks, where to get vaccinated, and available services on campus. Seating and attendance must be taken each class/lab. Masks are required in class, lab, and indoor spaces now. I plan to record each lecture and post it afterward on Moodle. All labs may be done remotely if needed but CFC IT will have to facilitate this.

Required assignments and tests:

Laboratory Exercises – During the first portion of class, this is time to work on the assigned exercises, later for working on projects with the instructor available to consult. ***Unexcused late labs are marked off 5% per calendar date late through the following week, and will not be accepted beyond the end of classes.***

Table/Graph Assignment – You will find an example of a published graph or table that you will write one paragraph criticizing, then redraft a “better” version, and then present this to the class.

Projects – Topics are to be chosen by the student and approved by the instructor. These may be directly related to one’s thesis work, or a desire to explore a new technique or type of imagery. Report format is formal. Development of a new exercise to be used by your peers is another option; in that case an exercise that could be distributed as is and appropriate files are the final product.

Exam – There is one exam for this course that will cover the lecture material. It may have multiple choice, matching, definitions, and short-answer questions.

Presentation – Each student will give a formal 15-min presentation. This presentation will review the student’s project, technical solutions found, and major conclusions from their work. The presentations should be well planned, illustrated, and given in a formal manner. Powerpoint is recommended. Grading will reflect the presentation as well as the content.

Course guidelines and policies:

Class Attendance – Incompletes will be given only for medical or family emergencies, but must be completed within 1 year: <https://catalog.umn.edu/academics/policies-procedures>.

Student Conduct Code – UM’s student conduct code (including academic honesty) is at: <https://www.umn.edu/student-affairs/community-standards/default.php>. Students failing to follow the code will be reported to the proper offices and receive a failing grade for the course.

Disability modifications – UM assures equal access to instruction through collaboration between students with disabilities, instructors, and the Office of Disability Equity (ODE). If you anticipate or experience barriers due to a disability, please contact them at: (406) 243-2243, ode@umontana.edu, or <https://www.umn.edu/disability/>. I will work with you and them to provide appropriate modification, however, retroactive accommodation requests cannot be honored, so please do not delay.

Recording: – You may not record during class except with written permissions from the instructor. I plan to record lectures from the podium with audio but do not plan to use a camera at all.

Grading Calculation:

| | | |
|--------------------|----------|--|
| Lab Exercises | 220 pts. | Labs are 20 - 40 pts each (20*number of weeks) |
| Exam | 50 pts. | Covers material from lecture |
| Assignment | 10 pts. | Examples of improved graph & tables |
| Prospectus | 10 pts. | 2 pg. Title, paragraph on problem, & outline |
| Final Presentation | 20 pts. | Review problem & results |
| Final Paper | 90 pts. | 10 pgs max. Formal paper summarizing project. |
| Total | 400 pts. | |

At the end of the course, the distribution will be examined and letter grades assigned at approximately: A=>90%, B=80-90%, C=70-80%, D=60-70%, etc. The “+/-” grading system will be used. ***There will be no extra credit of any kind.***

***** This syllabus may be modified as necessary during the course. Ask the instructor if you have any questions about when materials are due.**