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Fall 9-1-2018

### GPHY 589.01: Cartography/GIS Laboratory

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## Geography 587/9: Digital Image Analysis and Modeling/GIS Laboratory Fall 2018 Syllabus

**Instructor:** Dr. Anna E. Klene

**Office:** 216 Stone Hall

**Office hrs:** W 3-4:30 pm and by appt.

**TA:** Ryan Rock

**TA Office:** 206 Stone Hall

**Lecture:** T 2:00-3:20 pm, 218 Stone Hall

**Lab:** H 12:30-3:40 pm, 218 Stone Hall

**E-mail:** [anna.klene@umontana.edu](mailto:anna.klene@umontana.edu)

**TA Email:** [ryan.rock@umconnect.umt.edu](mailto:ryan.rock@umconnect.umt.edu)

**TA Office hrs:** T&W 9-11 am & by appt.

**Optional Reference Text:** Introductory Digital Image Processing, 4<sup>th</sup> Ed, Prentice Hall, NJ. 2015.

By: J.R. Jensen. **Other Texts** may be needed for your particular research project. Please check with me, the library, & ILL if you need additional resources.

**Objective:** 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.

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

		Tuesday Lecture	Thursday Lab	Lab Due
	Week 1	28 – Introduction & Orientation	30 – As needed: TerrSet/ArcGIS Tutorials	Not Graded
September	Week 2	4 – Image Corrections & PCA	6 – Lab 1: TerrSet Image Correction	
	Week 3	11 – Indices & Hyperspectral Imagery	13 –Lab 2: Hyperspectral	Lab 1
	Week 4	18 – Machine Learning Classifications	20 – Lab 3: Decision-Tree Classification	Lab 2
	Week 5	25 – Modeling Principles Prospectus Due	27 – Lab 4: RandomForest Classification – RMRS Tools	Lab 3
October	Week 6	2 – Modeling, MCE, & Logistic Regression	4 – Lab 5: Multi-Criteria Evaluation	Lab 4
	Week 7	9 – Modeling & Model Evaluation Stats	11 – Lab 6: Logistic Regression & Stats	
	Week 8	16 – Modeling Land-Cover & Habitat	18 – Labs & Student Projects	Lab 5
	Week 9	23 – Time-Series	25 – Lab 7: Google Earth Engine	Lab 6
November	Week 10	30 – UAVs & Soft Photogrammetry	1 – Lab 8: UAV imagery & Pix4D	Lab 7
	Week 11	6 – Election Day – No Classes	8 – Labs & Student Projects	Lab 8
	Week 12	13 – LiDAR	15 – Lab 9: Fusion Software	
	Week 13	20 – Table & Graphing Principles	22 – Thanksgiving – No Classes	
December	Week 14	27 – Labs & Student Projects	29 – Table/Graphing Assignment Due & Presentations; & Exam	Lab 9
	Week 15	4 – Final Student Presentations	6 – Final Student Presentations *Student Papers due Friday by 5pm*	

**Important dates:** Sept. 17: Last day to drop/add in Cyberbear with partial refund or change to “Audit”.

Oct. 29: Last day to drop with drop/add form (w/ prof & advisor sigs), \$10 fee, and “W” grade.

Dec. 7: Last Day to petition drop (w/ prof, advisor, & dean sigs), \$10 fee, and “WP” or “WF” grade.

**\*\* This syllabus may be modified as necessary during the course.\*\***



## Geography 587: Course Guidelines and Policy Statements

1. Course Outline - **KEEP** and use the attached outline.
2. Class Attendance – Is strongly recommended during lectures. If you miss a class, please borrow a fellow student's notes and review the PowerPoint presentations posted on the server. After doing this, if you have additional questions please see me during office hours or lab. Incompletes will be given only for medical or family emergencies, but must be completed within 1 year (<http://www.umt.edu/catalog/academics/academic-policy-procedure.php>).
3. Laboratory – During the first portion of class, this is time to work on the assigned exercises with the instructor available to consult. Towards the end of the semester, this is consultation time with the instructor and other students to help one another with computer technicalities that arise while working on individual research projects. Attendance is encouraged but not taken. ***Lab assignments are due one week after scheduled the last lab time devoted to them. Lab exercises are marked off 10% per calendar date late, and are not accepted beyond the next lab period.***
4. 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.
5. 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.
6. Project – Another large component of this class is the individual project. Topics are to be chosen by the student and approved by the instructor. While many of these may be directly related to one’s thesis work, others can be driven by 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.
7. 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, well illustrated, and given in a formal manner. Powerpoint or overheads are recommended. Grading will reflect the presentation as well as the content.
8. Academic Dishonesty - All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at [http://life.umt.edu/vpsa/student\\_conduct.php](http://life.umt.edu/vpsa/student_conduct.php).
9. Reasonable Accommodation - For reasonable accommodation please see me as soon as possible. Disability Services for Students can assist both of us in the modification process. For more information, visit the Disability Services website (<http://www.umt.edu/dss/default.php>).
10. Final Course Grade – 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. Credit/No Credit is also available. ***There will be no extra credit of any kind.***

<b>Grading:</b>	Lab Exercises	200 pts. Labs are 20 - 40 pts each (20*number of weeks)
	Prospectus	10 pts. 2 pg. Title, paragraph on problem, & outline
	Exam	50 pts. Covers material from lecture
	Assignments	10 pts. Examples of improved graph & tables
	Final Presentation	20 pts. Review problem & results
	<u>Final Paper</u>	90 pts. 10pgs max. Formal paper summarizing project.
	<b>Total</b>	<b>380 pts.</b>

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