Fall 9-1-2022

GPHY 487.01: Remote Sensing and Raster GIS & Laboratory

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Geography 487/9: Remote Sensing and Raster GIS & Laboratory
Fall 2022 Syllabus

Instructor:

Instructor: Dr. Anna Klene
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Course objectives:
Covers physical laws and principles that a user of aerial photos or satellite imagery should know. Know what questions to ask when given or acquiring imagery for a particular study. Overview of applications and limitations of current imagery. *Lab is required*.

Textbooks:
Recommended: Remote Sensing and Image Interpretation, 7th Edition, Wiley, NY. 2015. By: Lillesand, Kiefer, & Chipman. Note: the 6th edition is similar & less cost, but section numbers are slightly different.
Optional: An Introduction to Contemporary Remote Sensing, McGraw-Hill, Weng, 2012.

Tentative Course Outline:

Week	Topic:	Reading:
1:	History & Aerial Photography	Chapter 2.1-2 & 2.5-2.9
2/3:	Photogrammetry & Visual Interpretation	Ch. 3 & 1.12
4-5:	Remote Sensing Basics **Exam 1 & Grad Student Paragraph Due**	1-1.11, 2.3-2.4, & 7.2 **Sept. 29**
6:	Remote Sensing Basics	1-1.11, 2.3-2.4, & 7.2
7/8:	Vegetation Classifications & Acc. Assess.	Ch. 8.2 & 7.7-7.16 & 7.17-7.20
9:	Optical Satellites	Ch. 5.1-5.11 & 5.14-5.21
10:	**Exam 2**	**Nov. 3**
11:	Map Algebra	Only Class Notes
12:	Thermal Systems	Ch. 4.8-4.13
13/14:	Radar & Lidar	Ch. 6.1-6.22, 6.23-6.25
15:	Hyperspectral & High Res. **Exam 3**	Ch. 5.12-5.13, 6.18 & 7.21 **Dec. 8**
Exam:	**All Labs & Grad Student Project Due**	**Dec. 12**

Grading Calculation:

	Undergraduate	Graduate
Quizzes	up to 50 points	up to 50 points
3 Exams	500 pts.	500 pts.
Lab Exercises	275pts.	275 pts.
Graduate Student Project	NA	100 pts.
Total	775+ pts.	875+ pts.

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Important Dates:
Sept. 19: Last day to drop/add in Cyberbear with partial refund or change to "Audit".
Oct. 31: Last day to drop with drop/add link in Cyberbear (w/ prof & advisor sigs), $10 fee, and "W" grade.
Dec. 9: Last day to drop with drop/add link (w/ prof, advisor, & dean sigs), $10 fee, and "WP" or "WF" grade.

Coronavirus:
Please refer to https://www.umt.edu/coronavirus/default.php for the latest information, policies on masks, where to get vaccinated, and available services on campus. Recorded lecture from 2020 are available on the server. All labs may be done in the physical lab or remotely. **Please do not come to class or lab if you do not feel well.** If you need lecture notes, have questions, or anything else, please email both of us and we can help you catch up as needed.

Required assignments and exams:
Reading Assignments – The required reading assignments are listed above. The text for this course is intended (a) to provide further explanation of concepts covered in lecture and (b) to supplement the lectures by presenting additional information. You are responsible for reading assignments on all exams.

Exams – All exams in this course will be comprehensive. Remote Sensing builds one concept upon another and therefore all tests must contain some previously covered material. However, the exams will be oriented toward the section of the course most recently presented. The exam format will be mainly objective (multiple choice and definitions) and will consist of (a) concepts covered in lecture and (b) concepts covered in the required course readings. There is no provision for make-up exams. Exceptions will be made only for documented family or medical emergencies.

Laboratory Exercises – The exercises are a vital component of this class. They account for at least 33% of the final grade. This course is graded as a 4-credit class, with the same grade assigned for all 4 credits. Missing a lab does not relieve you of responsibility for completing the assignment on time. The physical lab is open at other times for you to finish assignments and remote options are available. These policies will be covered in the first laboratory. ***Lab exercises are marked off 5% per calendar date late through the following week, and will not accepted beyond Dec. 12th*** except for incompletes.

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

Course guidelines and policies:
Student Conduct Code – UM's student conduct code is clearly addressed at: https://www.umt.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.umt.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.

Grading: – 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.***

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Lab 001: W 11:00-12:50 pm, 218 Stone
Lab 002: W 1:00-2:50 pm, 218 Stone

<u>Lab Supplies</u>: This year all materials will be digital. Please remember to back up your work as the physical and virtual laboratory PCs are regularly cleaned of extra files throughout the semester.

Tentative Class Calendar:

Week	Tuesday Class	Wednesday Lab	Thursday Class
1	Aug. 30 – Intro	*Lab 1: Review Map Scale & Coordinate Systems*	Sept. 1 – History of Aerial Photography
2	6 – Photogrammetry	*Lab 2: Aerial Photography*	8 – Photogrammetry
3	Sept. 13 – Photogrammetry/Color	*Lab 3: Photogrammetry*	15 – Color/ Aerial Photo Interpretation
4	20 – Electromagnetic Spectrum	*Lab 4: Interpretation of B&W & CIR Images*	22 – EMS continued
5	27 – Review	*Lab 5: ArcGIS Pro Tutorial*	29 – **Exam 1** *Grad Paragraphs Due*
6	Oct. 6 – EMS continued	*Lab 6: UAV Orthomosaics*	8 – History of Satellites
7	13 – Virtual Globes	*Lab 7: Registering, & Image Interpretation*	15 – Supervised Classification
8	20 – Unsupervised & Fuzzy Classification	*Lab 8: Supervised & Unsup. Veg. Classification*	22 – Accuracy Assessment & Smoothing
9	27 – Orbits, Sensors, Satellites, etc.	*Lab 9: Accuracy Assess. of Missoula NLCD*	29 – Vegetation Indices & Landsat
10	Nov. 1 – Review	*Lab 10: Resolution & Indices*	3 – **Exam 2**
11	8 – **Election Day No Classes**	*Lab 11: Map Algebra: Simple Habitat Model*	10 – Map Algebra & Modeling
12	15 – Thermal Imagery	*Lab 12: Thermal & Radar Imagery*	17 – Thermal Imagery
13	22 – Radar	**No Classes**	24 – **Thanksgiving Holiday**
14	29 – Radar & Microwave Imagery	*Lab 13: Lidar*	Dec. 1 – LIDAR
15	6 – Hyper. & High Res. Imagery – Review online	Finishing Last Lab	8 – **Exam 3**
Exam Week	*Remaining Labs & Grad Projects are due Monday by midnight*		

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