

## Geography 487/9: Remote Sensing and Raster GIS & Laboratory Fall 2020 Syllabus

### Instructor:

Instructor: Dr. Anna Klene

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Office hours: Friday 12:30-2:30 pm

### 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, 7<sup>th</sup> Edition, Wiley, NY. 2015. By: Lillesand, Kiefer, & Chipman. Note: the 6<sup>th</sup> edition is okay & less cost, but section numbers are slightly different.

**Optional:** An Introduction to Contemporary Remote Sensing, McGraw-Hill, Weng, 2012.

### Tentative Course Outline:

Week 1:	History & Aerial Photography	Chapter 2.1-2 & 2.5-2.9
Week 2/3:	Photogrammetry & Visual Interpretation	Ch. 3 & 1.12
Week 4-5:	Remote Sensing Basics <b>Grad Student Paragraph Due</b> <b>Exam 1</b>	1-1.11, 2.3-2.4, & 7.2 <b>Sept. 17</b> <b>Sept. 22</b>
Week 6:	Optical Satellites	Ch. 5.1-5.11 & 5.14-5.21
Week 7/8:	Vegetation Classifications	Ch. 8.2 & 7.7-7.16 & 7.18-7.20
Week 9:	Accuracy Assessments	Ch. 7.17
Week 10:	Map Algebra <b>Exam 2</b>	Only Class Notes <b>Oct. 22</b>
Week 11:	Thermal Systems	Ch. 4.8-4.13
Week 12/13:	Radar & Lidar	Ch. 6.1-6.22, 6.23-6.25
Week 14:	Hyperspectral & High Res. <b>Exam 3</b>	Ch. 5.12-5.13, 6.18 & 7.21 <b>Nov. 20</b>
Week 15:	<b>All Labs &amp; Grad Student Project Due</b>	<b>Nov. 23</b>

### Grading Calculation:

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

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

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### **Important Dates:**

Sept. 9: Last day to drop/add in Cyberbear with partial refund or change to “Audit”.

Oct. 21: Last day to drop with drop/add link in Cyberbear (w/ prof & advisor sigs), \$10 fee, and “W” grade.

Nov. 18: 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 and policies on masks, distancing, and available services on campus.

### **Required assignments and tests:**

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 lab is open at other times for you to finish assignments. These policies will be covered in the first laboratory.

***Lab exercises are marked off 10% per calendar date late through the following week, and will not accepted beyond Nov. 23<sup>rd</sup> except for incompletes.***

Class Attendance – 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>).

### **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 Disability Services for Students. If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact DSS in Lommasson Center 154 or call 406.243.2243. I will work with you and DSS to provide appropriate modification.

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 12:00-1:50 pm, 218 Stone or Remotely

Lab 002: W 2:00-3:50 pm, 218 Stone or Remotely

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

**Class Calendar:**

Week	Tuesday Class	Wednesday Lab	Thursday Class
1	Orientation <b>No Classes</b>	<i>Lab 1: Review Map Scale &amp; Coordinate Systems</i>	Aug. 20 – Intro & History of Aerial Photography
2	25 – Photogrammetry	<i>Lab 2: Aerial Photography</i>	27 – Photogrammetry
3	Sept. 1 – Photogrammetry/Color	<i>Lab 3: Photogrammetry</i>	3 – Color/ Aerial Photo Interpretation
4	8 – Electromagnetic Spectrum	<i>Lab 4: Interpretation of B&amp;W &amp; CIR Images</i>	10 – EMS continued
5	15 – EMS continued	<i>Lab 5: TerrSet Tutorial &amp; Registering</i>	17 – EMS continued <b>Grad Paragraphs Due</b>
6	22 – <b>Exam 1</b>	<i>Lab 6: Resampling &amp; Image</i>	24 – History of Satellites
7	29 – Supervised Classification	<i>Lab 7: Supervised Veg. Classification</i>	Oct. 1 – Virtual Globes
8	6 – Unsupervised & Fuzzy Classification	<i>Lab 8: Unsupervised Veg. Classification</i>	8 – Accuracy Assessment & Smoothing
9	13 – Orbits/ Landsat, SPOT	<i>Lab 9: Accuracy Assess.: Missoula NLCD</i>	15 – GOES, POES, etc. & Vegetation Indices
10	20 – Map Algebra, Modeling & EOS Satellites	<i>Lab 10: Resolution Matters: Yellowstone</i>	22 – <b>Exam 2</b>
11	27 – Thermal Imagery	<i>Lab 11: Map Algebra: Climate Modeling in Kenya</i>	29 – Thermal Imagery
12	Nov. 3 – Election Day <b>No Classes</b>	<i>Lab 12: Thermal &amp; Radar Imagery</i>	5 - Radar
13	10 – Radar & Microwave Imagery	Veteran's Day <b>No Classes</b>	12 – LIDAR
14	17 – Hyperspectral & High Res. Imagery	<i>Lab 13: Lidar</i>	<b>Exams Begin Exam 3 = Friday</b>
15	<b>Grad Projects &amp; All Labs Due Monday by midnight</b>	<b>Exams End</b>	<b>Thanksgiving Holiday</b>