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Fall 9-1-2016

### GPHY 487.01: Remote Sensing and Raster GIS

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**Geography 487/489: Remote Sensing and Raster GIS & Laboratory**  
**Fall 2016 Syllabus**

**Instructor:** Dr. Anna Klene

**Office:** 216 Stone Hall

**Teaching Assistant:** Brianna Rick

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**Office hr:** W 3-4:30 pm & by appointment

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**TA Office hrs:**

**E-mail:** brianna.rick@umconnect.umt.edu

**Learning 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.**

**Text:** Remote Sensing and Image Interpretation, 7<sup>th</sup> Edition, Wiley & Sons, NY. 2015.

By: T.M. Lillesand, R.W. Kiefer, & J.W. Chipman (6<sup>th</sup> okay & less \$\$\$, but section #s are different).

**Optional Text:** An Introduction to Contemporary Remote Sensing, 1<sup>st</sup> Ed., McGraw-Hill, Q. Weng, 2012.

**Tentative Course Outline:**

<b>Week 1:</b>	History & Aerial Photography	Chapter 2.1-2 & 2.5-2.9
<b>Week 2/3:</b>	Photogrammetry & Visual Interpretation	Ch. 3 & 1.12
<b>Week 4-6:</b>	Remote Sensing Basics	1-1.11, 2.3-2.4, & 7.2
	<b>Midterm Exam 1</b>	<b>Sept. 29</b>
	<b>Grad Student Paragraph Due</b>	<b>Oct. 6</b>
<b>Week 7:</b>	Optical Satellites	Ch. 5.1-5.11 & 5.14-5.21
<b>Week 8:</b>	Vegetation Classifications	Ch. 8.2 & 7.7-7.16 & 7.18-7.20
<b>Week 9:</b>	Accuracy Assessments	Ch. 7.17
<b>Week 10-11:</b>	<b>Midterm 2</b>	<b>Nov. 3</b>
	Map Algebra	Only Class Notes
	Hyperspectral & High Res.	Ch. 5.12-5.13, 6.18 & 7.21
<b>Week 12/13:</b>	Thermal Systems	Ch. 4.8-4.13
<b>Week 13/14:</b>	Radar	Ch. 6.1-6.22
<b>Week 15:</b>	Lidar	Ch. 6.23-6.25
	<b>Grad Student Project Due</b>	<b>Dec. 9</b>
	<b>Final Exam</b>	<b>Wed., Dec. 14, 10 am</b>

**Grading Procedure:**

	<u>Undergraduate</u>	<u>Graduate</u>
Quizzes	up to 50 points	up to 50 points
2 Midterm Exams	300 pts.	300 pts.
Final Exam	200 pts.	200 pts.
Lab Exercises	275pts.	275 pts.
<u>Graduate Student Project</u>	<u>NA</u>	<u>100 pts.</u>
<b>Total</b>	<b>775+ pts.</b>	<b>875+ pts.</b>

**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 form (w/ prof & advisor sigs), \$10 fee, and "W" grade.

Dec. 12: 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 487 Course Guidelines and Policy Statements

1. Course Outline - **KEEP** and use the attached outline to maintain continuity throughout the course. Each major topic has a different quantity of concepts that need to be covered so do not assume each section refers to a specific lecture period.

2. Reading Assignments - The required reading assignments are listed on your outline. 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 these reading assignments for all exams.

3. 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.

4. 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, and are not accepted beyond the next lab period.**

5. Class Attendance - Is strongly recommended. Quizzes may be given on any day and cannot be made up if missed without an acceptable documented excuse. If you happen to miss a class, please borrow a fellow student's notes and review the PowerPoint presentations that I post on the department 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>).

6. Disability Accommodations - 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>).

7. 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).

8. 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 available. **There will be no extra credit of any kind.**

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**Geography 489  
Fall 2016 Schedule**

**Lab 001:** W 11:00-12:50 pm, 218 Stone

**Lab 002:** W 1:00-2:50 pm, 218 Stone

**Lab supplies:** Calculator, colored pencils, & a magnifying glass for Labs 1-4. USB memory stick should be used to save your computer labs (3-13) at the end of each exercise to back up your work.

	<b>Tuesday class</b>	<b>Wednesday lab</b>	<b>Thursday class</b>
<b>September</b>			
Week 1	30 – Introduction	<i>Lab 1: Review Map Scale &amp; Coordinate Systems</i>	1 – History of Aerial Photography
Week 2	6 – Photogrammetry	<i>Lab 2: Aerial Photography</i>	8 – Photogrammetry
Week 3	13 – Color	<i>Lab 3: Photogrammetry</i>	15 – Aerial Photo Interp.
Week 4	20 – EMS continued	<i>Lab 4: Interpretation of B&amp;W &amp; CIR Images</i>	22 – Electromagnetic Spectrum
Week 5	27 – Review 1	<i>Lab 5: TerrSet Tutorial</i>	29 – <b>Exam 1</b>
<b>October</b>			
Week 6	4 – EMS continued	<i>Lab 6: Resampling and Registering: MA &amp; WI</i>	6 – Virtual Globes <b>Grad Paragraphs Due</b>
Week 7	11 – History of Satellites	<i>Lab 7: Image Interpretation Basics</i>	13- Orbits/ Landsat, SPOT, GOES, POES, etc.
Week 8	18 – Supervised Classification	<i>Lab 8: Supervised Veg. Classification</i>	20 – Unsupervised & Fuzzy Classification
Week 9	25 – Accuracy Assessment & Smoothing	<i>Lab 9: Unsupervised Veg. Classification</i>	27–Vegetation Indices & EOS Satellites
<b>November</b>			
Week 10	1 – Review 2	<i>Lab 10: Accuracy Assess.: Missoula NLCD</i>	3 – <b>Exam 2</b>
Week 11	<b>Election Day No Classes</b>	<i>Lab 11: Resolution Matters: Yellowstone</i>	10 – Map Algebra, Modeling
Week 12	15 – Hyperspectral & High Resolution	<i>Lab 12: Map Algebra: Climate Modeling in Kenya</i>	17 – Thermal Imagery
Week 13	22 – Thermal Imagery	<b>No Classes</b>	<b>Thanksgiving Holiday</b>
<b>December</b>			
Week 14	29 – Radar & Microwave Imagery	<i>Lab 13: Thermal &amp; SLAR Imagery</i>	1 – Guest Lecture on Microwave – Dr. Kim
Week 15	6 – LIDAR	<i>All Labs Due</i>	8 – Review 3 <b>Grad Projects Due Friday</b>
<b>Exam Week</b>	<b>Final Exam –</b> Wednesday, Dec. 14, 10:10-12:10 pm		

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