San José State University
Geography
Geog 181, Remote Sensing: Basic Theory and Image Interpretation, 28077 & 28078, Spring, 2021

Instructor(s):	Jeffrey Miller
Office Location:	Virtual
Telephone:	N/A
Email:	jeffrey.c.miller@sjsu.edu
Office Hours:	Thursdays, 2PM on Zoom
Class Days/Time:	ONLINE, Asynchronous format, More info at sjsu.edu/
Classroom:	ecampus https://sjsu.instructure.com/courses/1416832
Prerequisites:	Geog 170 & Sophomore or upper division standing
Units:	3

Course Description

Acquisition, interpretation and applications of imagery obtained from both airborne and satellite platforms. Includes visual interpretation and analysis of airphotos and non-photographic images, such as radar and thermal infrared. Remotely-sensed imagery as a source for mapping and geographic information systems.

Software and Computer Requirements

This course will be both technology intensive and delivered 100% online. There will be a combination of lecture and lab. Labs will require the use of ArcGIS Pro and other ESRI software products. It is required that students have access to a PC with a Windows OS operate ArcGIS Pro. Access must allow for write permissions. Contact the instructor if you do not have direct access to a Windows-based machine.

Students will be provided license access to ArcGIS Pro and other necessary ESRI products.

Canvas and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on Canvas Learning Management System course login website at https://sjsu.instructure.com/courses/1416832. You are responsible for regularly checking with the messaging system through MySJSU on Spartan App Portal http://one.sjsu.edu (or other

communication system as indicated by the instructor) to learn of any updates. For help with using Canvas see Canvas Student Resources page (http://www.sjsu.edu/ecampus/teaching-tools/canvas/student_resources)

Course Learning Outcomes (CLO)

Students will get fundamental training in remote sensing to understand the power and limitations of satellite data. They will gain hands-on experience with remotely sensed data and learn how to turn that data into actionable information, such as a classified map that could be used with GIS software. In combination with the 170/171 series, students will be well prepared for complex spatial analysis and modeling in a variety of fields.

Student learning outcomes:
A. Explain the underlying principles of remote sensing.
B. Identify the various techniques of remote sensing and describe how these techniques are used for collecting spatial data.
C. Distinguish between active and passive remote sensing.
D. Interpret satellite images, aerial photographs, and Light Detection and Ranging (LIDAR) images.
E. Evaluate analog and digital image processing.
F. Identify and categorize information and reconstruct various maps using remotely sensed data.
G. Open, manage, and organize imagery and orthophoto using image processing software.

Required Texts/Readings

Textbook

Campbell, J., & Wynne, R. (2011). Introduction to Remote Sensing, Fifth Edition. The Guilford Press. 978-1609181765

https://www.amazon.com/Introduction-Remote-Sensing-Fifth-Campbell/dp/160918176X

Other Readings

If applicable, will be provided by the instructor digitally.

Other technology requirements / equipment / material

Computer and software required. See Software Requirements.

Expectations and Student Success (Course Requirements)

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus. Special projects or assignments may require additional work for the course. Careful time management will help you keep up with readings and assignments and enable you to be successful in all of your courses.

The course will be broken into modules on Canvas. Each week (or every other as posted), the instructor will provide pre-recorded video lectures that will correspond to a power point and chapter for the textbook that fit said module. A quiz will also follow. Finally, there will be a lab assignment included in the module. The instructor will provide lab instructions in a digital format as well as a short tutorial video. Student success will be derived from successful completion of weekly modules.

Final Report

A final report will be due at the end of the semester (May 16th, 2021). The premise will be a proposal to explain the use of remote sensing technology for a TBD application. An example title could be: "Using LiDAR to determine the volume of materials moved at a given quarry."

Grading Information

Grades will be awarded based on points earned from assignments. These include:

- Quizzes = 15 points each x 10 = 150 points
- Labs = 20 points each x 10 = 200 points
- Final Report = 100 points
- Total Points available = 450 points

The instructor does not curve grades. Points earned equals grade achieved as follows:

A = 405-450 points
B = 360-404 points
C = 315-359 points
D = 270-314 points
F = 269 points or lower

Grade	*Points*	*Percentage*
A	*405-450*	*90-100%*
B	*360-404*	*80-89%*
C	*315-359*	*70-79%*
D	*270-314*	*60-69%*
F	*269 or lower*	*<60%*

University Policies

Per University Policy S16-9 *(http://www.sjsu.edu/senate/docs/S16-9.pdf)*, relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on Syllabus Information web page (https://www.sjsu.edu/curriculum/courses/syllabus-info.php). Make sure to visit this page to review and be aware of these university policies and resources.

Accommodation for Disabilities
If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

SJSU Writing Center
The SJSU Writing Center is located in Clark Hall, Suite 126. All Writing Specialists have gone through a rigorous hiring process, and they are well trained to assist all students at all levels within all disciplines to become better writers. In addition to one-on-one tutoring services, the Writing Center also offers workshops every semester on a variety of writing topics. To make an appointment or to refer to the numerous online resources offered through the Writing Center, visit the Writing Center website at http://www.sjsu.edu/writingcenter.

SJSU Counseling and Psychological Services
The SJSU Counseling and Psychological Services is located on the corner of 7th Street and San Fernando Street, in Room 201, Administration Building. Professional psychologists, social workers, and counselors are available to provide consultations on issues of student mental health, campus climate or psychological and academic issues on an individual, couple, or group basis. To schedule an appointment or learn more information, visit Counseling and Psychological Services website at http://www.sjsu.edu/counseling.

Geog 181 / Introduction to Remote Sensing, Spring '21, Course Schedule

Course Schedule

Module	Date	Topics, Readings, Assignments	Due Date
1	1/27	**History of Remote Sensing** Text: Chapter 1 Quiz 1 Lab 1: Exploring Rasters	**2/7**
2	2/8	**Electromagnetic Radiation** Text: Chapter 2 Quiz 2 Lab 2: Image Band Combinations	**2/21**
3	2/22	**Overview of Satellites** Text: Chapter 6 Quiz 3	**2/28**

Module	Date	Topics, Readings, Assignments	Due Date
		Lab 3: Timeline Landsat Imagery	
4	3/1	**Film vs Digital Photography** Text: Chapters 3 & 4 Quiz 4 Lab 4: Stereopairs & Photogrammetry	**3/7**
5	3/8	**Image Interpretation and Georeferencing** Text: Chapters 5 &10 Quiz 5 Lab 5: Projecting Rasters and Control	**3/21**
6	3/22	**Vegetation Indices** Text: Chapter 17 Quiz 6 Lab 6: NDVI and Index Analysis	**3/28**
7	3/29	**Image Classification** Text: Chapter 12 Quiz 7 Lab 7: Classification Techniques	**4/11**
8	4/12	**Change Detection** Text: Chapter 16 Quiz 8 Lab 8: Imagery Change Comparison	**4/18**
9	4/19	**Radar, LiDAR, & DEMs** Text: Chapters 7 & 8 Quiz 9 Lab 9: DEM Manipulation, LiDAR Point Clouds	**5/2**
10	5/3	**Unmanned Aircraft Systems (UAS)** Text: TBD Quiz 10 Lab 10: Processing UAS Imagery	**5/9**
Final Report	5/10	Report due on Sunday, 5/16	**5/16**