

GTECH 32100/GTECH71200
Remote Sensing of the Environment
Spring 2019
Tuesday 5:35 PM – 9:15 PM, HN1090B-1

Contact Information

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Prerequisites: GTECH 20300/71100 or permission of instructor

Course Materials:

Remote Sensing of The Environment, 2nd Edition, John R. Jensen, Pearson Prentice Hall, ISBN-13: 978-0131889507 and ISBN-10: 10131889508.
Introductory Digital Image Processing: A Remote Sensing Perspective, 4th Edition, John R. Jensen, Pearson Prentice Hall, ISBN-13: 978-0134058160 and ISBN-10: 013405816X.

Course Description:

This course introduces students to the field of remote sensing, particularly focusing on the use of satellite imagery to study the environment. It covers two main topics: remote sensing principles and satellite sensors. For the first half of semester students will learn the nature and properties of electromagnetic radiation and how it interacts with atmosphere and the Earth's surface. The second half of the semester students will be exposed to a wide variety of satellite sensors for making measurements across the optical, thermal and microwave electromagnetic spectrum. Different sensors are designed to sense different attributes of the Earth and the atmosphere and for different applications. We explore how different sensors are used to study issues related to global environmental science and natural resource management.

The course is supplemented by heavy lab components. The labs will include practical assignments, field exercises, and computer-based analysis of remotely-sensed images. The labs are primarily devoted to learning how to use image processing software – ENVI to analyze satellite images.

Learning Outcomes:

At the end of this course, students will:

- Identify and define basic remote sensing principles
- Recognize and explain how the remote sensing data are collected
- Analyze remote sensing images using image processing tools ENVI
- Distinguish and state how different satellite data are being used monitoring our changing environment.
- Transform satellite data into solutions to environmental problems

Grading:

Lab exercises	40%
Final Exam/Final project	40%
Quizzes	20%

Lab exercises will be given each week to learn image processing skills using ENVI] Assignments are due one week after given in class. It is in your best interests to meet deadlines for lab assignments. Incomplete grades and time extensions are not an option for this course. Unless otherwise instructed, you will submit assignments in electronic forms through BlackBoard. All labs exercises are designed to complete during your lab period. You are free to work with them after class. It is your responsibility to manage your time to finish your las on time. **I take late work, however if you turn in an assignment late expect to have the final grade reduced by 10% for every day late. So, if you turn it in two days late 20% is taken off even before I begin grading your paper. At ten days you get no credit for your late work.**

Quizzes: Instead of the in-class midterm exam, quizzes will be given at the beginning of each class meeting. Quizzes include short-answer questions based on the material covered from previous lectures. **There is no make-up quizzes.**

Final Project/Final Exam includes your final project paper and project presentation to the class at the end of the semester. For the final project, you will use the image processing skills learned through the course to analyze satellite images to solve a physical or social environmental problem. Graduate students are expected to do much more comprehensive final projects than undergraduate students. Different grading system will be used for undergraduate and graduate students. **The final papers and presentations are due the date of the final exam. No late work will be accepted after the final exam date.**

You need to submit all the required work to BB. I do not take any submission by email.

Grading Policy

Grading will following Hunter College policy as outlined in the online undergraduate catalog that can be found at <http://catalog.hunter.cuny.edu/>

I do not give incompletes (IN) except under the most extraordinary, and documented, circumstances. You must contact me within 48 hours of the final exam and request IN as a grade. At that time you will schedule a date to meet with me at the college and complete a Contract to Resolve Incomplete Grades. Otherwise, I will average the grades I have for you and record you the grade you have earned.

If you miss the final exam, you must (1) contact me within 48 hours of the missed exam, (2) present acceptable documentary evidence for your absence, and (3) be available for the make-up exam (Note: there will be one make-up exam day at the end of the semester held outside of class for those eligible). A make-up exam covers the same material as the regular exam but will not be the same exam given as scheduled. (i.e. DON'T MISS AN EXAM).

Only undergraduate students are eligible for credit/no credit (C/NC) as a final course grade. Please see the college's policy on C/NC at <http://catalog.hunter.cuny.edu/content.php?catoid=37&navoid=10489>. You must meet submit your CR/NC form no later than 15 minutes before the final presentation period.

Resources

- All class material will be posted on Bb.

Essential Policy Information:

- Attendance/lateness policy: It is extremely important to attend the regular lectures and labs and take detail notes. Students who attend classes regularly are much more successful than those who are not.

- Email Policy
 - Please use GTECH321/712 Remote Sensing of Environment in the subject line when you email me. I do not answer email with insufficient subject lines.
 - Email me from your @myhunter account.
 - Please sign your full name as it appears in CUNYfirst to any message. I do not answer unsigned email messages.
 - Student's email will be responded within 24 hours. Please note there will be a delay for messages sent over the weekend or during non-business hours.
- Cell Phone Policy
 - Out of respect for preserving a positive learning environment, all cell phones, beepers, and other portable noise-making devices must be SILENCED for the duration of the class period.

Hunter College Statement on Academic Integrity

Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures. Plagiarism, dishonesty, or cheating in any portion of the work required for this course will be punished to the full extent allowed according to Hunter College regulations.

ADA Policy

In compliance with the American Disability Act of 1990 (ADA) and with Section 504 of the Rehabilitation Act of 1973, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical, and/or Learning) consult the Office of AccessABILITY, located in Room E1214B, to secure necessary academic accommodations. For further information and assistance, please call: (212) 772- 4857 or (212) 650-3230.

Hunter College Policy on Sexual Misconduct

In compliance with the CUNY Policy on Sexual Misconduct, Hunter College affirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationship. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College.

- a. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, on contacting the College's Public Safety Office (212-772-4444)
- b. All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) of Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123.

CUNY Policy on Sexual Misconduct Link: <http://www.cuny.edu/about/administration/offices/la/Policy-on-Sexual-Misconduct-12-1-14-with-links.pdf>

Syllabus Change Policy

- Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.
- Any changes will be updated through Bb.

Tentative Daily Schedule and Readings

Week	Date	Lecture Topics	Labs	Readings
Week 1	Jan. 29	Overview of the Course	Introduction to ENVI	RSE-Ch 1
Week 2	Feb. 5	Physical Principles: Electromagnetic Radiation (EMR)	Image Display	RSE-Ch 2
	Feb. 12	Lincoln's Birthday – College is Closed		
Week 3	Feb. 19	Physical Principles: Light Interaction with Atmosphere	Basic Image Formats	RSE-Ch2
Week 4	Feb. 26	Physical Principles: Light Interaction with Surface	ENVI Basic Functions	RSE-Ch 2
Week 5	Mar. 5	Satellite Remote Sensing Systems	ENVI Basic Functions	RSE-Ch 7
Week 6	Mar. 12	Satellite Remote Sensing Systems	Satellite Imagery Online	RSE-Ch 7
Week 7	Mar. 19	Feature Extraction: Preprocessing	Image Enhancement	DIP-Ch8
Week 8	Mar. 26	Feature Extraction: Image Classification	Image Classification	DIP-Ch9&10
Week 9	Apr. 2	Feature Extraction: Accuracy Assessment	Image Classification	DIP-Ch13
	Apr. 9	Change Detection	Change Detection	
Week 10	Apr. 16	Thermal Sensors and Application	Urban Heat	RSE-Ch 8
Week 11	Apr. 23	Spring Recess		
Week 12	Apr. 30	Lidar Sensors and Applications	Final Project	RSE-Ch 10
Week 13	May 7	SIFs Sensors and Applications	Final Project	
Week 14	May 14	Final Review	Final Project Presentation	
Week 15	May 21	Final Paper Due	Final Project Presentation	