

GTECH 32100/GTECH71200
Remote Sensing of the Environment
Fall 2024 – in person
Thursday 5:30 PM – 9:10 PM, HN1090B

Contact Information

Instructor: Sean C. Ahearn

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Office: HN1023 Office Phone: 212-772-5327

Office hours: Thursday: 4:30pm-5:30pm pm or by appointment Department Information: HN1023

Prerequisites: GTECH 201/709 or permission of instructor

Course Materials:

(Optional) 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 is an introductory course to remote sensing. Students will learn how remote sensing works, what satellite data are available, and how they are being used. We first introduce the basic principles of how satellites detect and monitor the physical characteristics of our Earth. Then, we will discuss various satellite sensors for making measurements across the optical, thermal, and microwave electromagnetic spectrum and multiple applications of using these data. Students will learn basic skills to extract useful information from satellite imagery data for various applications. The course has heavy lab components. The labs are primarily devoted to learning how to use image processing software – ENVI and ArcGIS 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
- Distinguish and state how different satellites monitor 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 weekly to learn image processing skills. Lab homework is due one week after each lab. It is in your best interests to meet deadlines for all lab assignments. Unless otherwise instructed, you will submit all your projects in electronic forms through BlackBoard. All labs are designed to complete during your lab period. You are free to work with them after class. You are responsible for managing your time to finish your lab on time. Quizzes: Instead of the in-class midterm exam, quizzes will be given at the beginning of most class meetings. Examinations include short-answer questions based on the material covered in previous lectures. There are no make-up quizzes. Final

Project/Final Exam includes your final project paper and a 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 complete final projects than undergraduate students. Different grading systems will be applied to undergraduate and graduate students. The final papers and presentations are due on the final exam date. No late work will be accepted after the last exam date. You need to submit all the necessary work to BB. I do not take any submissions by email.

Grading Policy

Grading will follow Hunter College policy outlined in the online undergraduate catalog: 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. You will schedule a date to complete a Contract to Resolve Incomplete Grades at that time. Otherwise, I will average the steps I have for you and record 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 makeup 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 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 essential to attend the regular lectures and labs and take detailed notes. Students who attend classes regularly are much more successful than those who are not.
- Email Policy
 - o Please use GTECH321/712 Remote Sensing of Environment in the subject line when you email me. I do not answer emails with short subject lines.
 - o Email me from your @myhunter account. Please sign your full name to any message. I do not answer unsigned email messages.
 - o The student's email will be responded to within 24 hours. Please note there will be a delay for messages sent over the weekend or during non-business hours.
- Cell Phone Policy
 - o Out of respect for preserving a positive learning environment, all cell phones and other portable noise-making devices must be SILENCED during the period. Cell phone use is prohibited in the classroom. If you have to use it, please walk out of the classroom

CUNY Policy

Hunter College Policy 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 the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

Hunter College's Policy on Students with Disabilities:

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 E1124 to secure necessary academic accommodations. For further information and assistance please call (212- 772-4857)/TTY (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. 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)

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 5 (colleen.barr7@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123.

Policy on Sexual Misconduct can be found

at <http://www.hunter.cuny.edu/diversityandcompliance/title-ix>

Preferred Gender Pronoun

All people have the right to be addressed and referred to in accordance with their personal identity. In this class, we will have the chance to indicate the name that we prefer to be called and, if we choose, to identify pronouns with which we would like to be addressed. I will do my best to address and refer to all students accordingly and support classmates in doing so as well."

Syllabus Change Policy

- Except for changes that substantially affect the 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

Schedule (note: additional speakers may be added) Each week corresponds to a Chapter in Jenson

August 29	Remote Sensing and Digital Image Processing
September 5	Remote Sensing Data Collection
September 12	Digital Image Processing Hardware and Software
September 19	Image Quality Assessment and Statistical Evaluation
September 26	Display Alternatives and Scientific Visualization
October 3	No class (holiday)
October 10	Electromagnetic Radiation Principles and Radiometric Correction
October 17	Geometric Correction
October 18	Image Enhancement
October 31	Thematic Information Extraction: Pattern Recognition
November 7	Information Extraction Using Artificial Intelligence
November 14	Information Extraction using imaging spectroscopy
November 21	Change Detection
November 28	No class
Dec 5	Remote Sensing – Derived Thematic Maps Accuracy Assessment
Dec 12	Final presentations
Dec 19	Final presentations