



**Syllabus: Spring 2025**

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Course Information	<p>GG379: Remote Sensing          Location: Exploratory hall 2310 / Hybrid Learning / Canvas          Wednesdays 3:00 – 4:15pm</p>
Instructor	<p>Dr. Konrad Wessels          About Konrad Wessels COS (<a href="https://science.gmu.edu/directory/konrad-wessels">https://science.gmu.edu/directory/konrad-wessels</a>). Also see Instructor Introduction video in Canvas          Kwessel4@gmu.edu</p>
Office Hours	By appointment request via email. Kwessel4@gmu.edu
Teaching Assistant	Tunaggina S Khan, <a href="mailto:tkhan10@gmu.edu">tkhan10@gmu.edu</a> . Email her with any queries with ENVI and Assignments
Course Description	<p>The world is currently experiencing a proliferation in image data from satellites, aircraft and UAV's. These images have to be processed to produce geospatial information to inform natural resource management, urban planning, defense intelligence and business decisions. This course will introduce the foundations of remote sensing, as well as the processing and analyses of imagery for diverse applications using ENVI. The course will introduce key concepts in electromagnetic radiation, passive (multi-spectral) and active (Lidar) sensor systems, and methods for image processing, classification and geospatial information extraction.</p>
Course Objectives	<p>Upon completion of the course, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Understand and explain the key theories of remote sensing and image analysis.</li> <li>2. Use image processing tools to process imagery to geospatial products.</li> <li>3. Gain fundamental insight into the use of remote sensing for multiple, real-world applications.</li> </ol>
Course Methodology	<p><b>This will be a hybrid course that will provide on-line material, but meet in person weekly for crucial interaction and required participation.</b> The class format will combine reading, lectures, in-class presentations, and hands-on processing of satellite imagery. The class will be interactive and require every student to be engaged in the material and assignments. In addition to the lectures and timely completion of assignments, <b>every student will be expected to be an active participant in class.</b>  <b><u>Go to "Start Here: Welcome" in Canvas for Course instructions.</u></b></p>
Required textbook(s) and/or materials	<p>Required Textbook:  <b>Relevant chapters are available as pdf under " Textbook" at the bottom of the main menu of this course's Canvas page</b></p>

	<p>“Remote Sensing and Image Interpretation” by Lillesand, Kiefer and Chipman (7<sup>th</sup> edition, John Wiley &amp; Sons). <a href="https://www.wiley.com/en-us/Remote+Sensing+and+Image+Interpretation%2C+7th+Edition-p-9781118919477">https://www.wiley.com/en-us/Remote+Sensing+and+Image+Interpretation%2C+7th+Edition-p-9781118919477</a>.</p> <p>Additional Textbook: In the lecture presentations I also use figures and Examples from “Introductory Digital Image Processing: A Remote Sensing Perspective, 4th Edition” by J.R. Jensen. (4<sup>th</sup> edition, Pearson). <a href="https://www.pearson.com/us/higher-education/program/Jensen-Introductory-Digital-Image-Processing-A-Remote-Sensing-Perspective-4th-Edition/PGM30020.html">https://www.pearson.com/us/higher-education/program/Jensen-Introductory-Digital-Image-Processing-A-Remote-Sensing-Perspective-4th-Edition/PGM30020.html</a></p>
Computer Requirements	<p><b>ENVI has the following system requirements:</b></p> <p>Operating systems:  Windows 10 and 11 (Intel/AMD 64-bit)  macOS 11.5 and 12 (M1 and Intel 64-bit)(<b>not recommended – ENVI on iOS is slow as it uses X-Windows. Rather use windows PC / Laptop</b>)</p> <p>Linux (Intel/AMD 64-bit, kernel 4.18.0 or higher and glibc 2.28 or higher)  Disk space: Approximately 4 GB for installation  Memory (RAM): Minimum of 8 GB  Number of processing cores: Minimum of 2, recommended 4 or more  Graphics card: Minimum of 1 GB RAM and support for Open GL 2.0 or later  ENVI 5.7 has been tested with ArcGIS Pro version 3.0.</p> <p>An X-Windows manager is required for macOS. ENVI was tested using XQuartz 2.8.5.</p> <p>A Rosetta 2 emulator is required for Mac M1.</p> <p><b>Course-specific Hardware/Software</b></p> <p>You will have to install <b>ENVI</b> on your own computer. <b>Temporary student licenses have been provided for home installation by NV5 Geospatial.</b> <a href="https://www.nv5geospatialsoftware.com/Products/ENVI">https://www.nv5geospatialsoftware.com/Products/ENVI</a></p> <p><b>Home installation instructions will be provided on Canvas page /Start Here/Welcome.</b></p>
Cheating Policy	<p>Any form of cheating on an activity, project, or exam will result in zero points earned.</p> <p>“Cheating” includes, but is not limited to, the following: reviewing others’ exam papers, having ANY resources utilized when not allowed, collaborating with another student during an individual assignment or exams. Consulting internet resources during an exam constitutes cheating.</p> <p><b>Using ChatGPT to answer questions in Assignments and exams.</b></p>
Individuals with Disabilities	<p>Students with documented disabilities should contact the <a href="#">Office of Disability Services</a> (703) 993-2474) to learn more about accommodations that may be</p>

	available to them. <b>Documentation for accommodations has to be provided to the instructor at the start of the semester.</b>																																		
Course Grading & Evaluation	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Assignments</td> <td>45%</td> </tr> <tr> <td>Midterm exam</td> <td>20%</td> </tr> <tr> <td>Quizzes and participation</td> <td>15%</td> </tr> <tr> <td>Final exam</td> <td>20%</td> </tr> <tr> <td><b>Total:</b></td> <td><b>100%</b></td> </tr> </table> <p>Grades will be assigned as follows:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Weighted average range</th> <th>Letter grade</th> </tr> </thead> <tbody> <tr> <td>&gt;98.0</td> <td>A+</td> </tr> <tr> <td>97.9 – 93.0</td> <td>A</td> </tr> <tr> <td>92.9 – 90.0</td> <td>A</td> </tr> <tr> <td>89.9 – 87.0</td> <td>A-</td> </tr> <tr> <td>86.9 – 83.0</td> <td>B+</td> </tr> <tr> <td>82.9 – 80.0</td> <td>B+</td> </tr> <tr> <td>79.9 – 77.0</td> <td>B</td> </tr> <tr> <td>76.9 – 73.0</td> <td>B-</td> </tr> <tr> <td>72.9 – 70.0</td> <td>C</td> </tr> <tr> <td>69.9 – 60.0</td> <td>D</td> </tr> <tr> <td>&lt; 59.9</td> <td>F</td> </tr> </tbody> </table>	Assignments	45%	Midterm exam	20%	Quizzes and participation	15%	Final exam	20%	<b>Total:</b>	<b>100%</b>	Weighted average range	Letter grade	>98.0	A+	97.9 – 93.0	A	92.9 – 90.0	A	89.9 – 87.0	A-	86.9 – 83.0	B+	82.9 – 80.0	B+	79.9 – 77.0	B	76.9 – 73.0	B-	72.9 – 70.0	C	69.9 – 60.0	D	< 59.9	F
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Discussion board	We will use Discussion board mainly for trouble shooting during Assignments.																																		
Assignments – 45%	Each week’s assignment has to be uploaded to Canvas by the due date and time. Assignments are due by Sunday, 11:59 PM, ET unless otherwise stated. Refer to the course schedule and weekly overviews for details. See further information on Assignments below. <b>DO NOT FALL BEHIND ON ASSIGNMENTS. Late assignments will incur a 5-10 point penalty.</b>																																		
Exams – 40%	Mid-term Exam 20% Final Exam 20% <b>Exams are open-book, open-note, but are challenging.</b>																																		

**Assignments:**

- Expect to work **2-3 hours per week** on assignments for this course.
- Submission of assignment report should be done only **through the Canvas course website**. Reports should be neat and clearly indicate question number and answer. Insert cropped screen shots of processed satellite imagery at appropriate zoom level to respond to the question.
- Submit **pdf files** of assignment to Canvas, not Word documents.
- Unless otherwise stated, all assignments are due by the end of the week in which they are assigned.
- For the purposes of this course, a week is defined as **beginning at 12:01 am each Monday EST, and ending at 11:59 pm on the following Sunday EST.**

- Each Assignment will have a **demo video** which explains all the steps you need to follow in ENVI - be sure to watch the video. ENVI's website also has outstanding instructions and additional information for each function in the software. If you have a specific question, email the LA/TA for help. If the question and answer is potentially useful to other students, the TA will post it on Discussion Board.

## **Common Policies Affecting All Courses at George Mason University**

### **Updated August 2024**

These four policies affect students in all courses at George Mason University. This Course Policy Addendum must be made available to students in all courses (see [Catalog Policy AP.2.5](#)).

**Additional policies** affecting this course, and additional resources or guidance regarding these policies, may be provided to students by the instructor.

### **Academic Standards**

Academic Standards exist to promote authentic scholarship, support the institution's goal of maintaining high standards of academic excellence, and encourage continued ethical behavior of faculty and students to cultivate an educational community which values integrity and produces graduates who carry this commitment forward into professional practice.

As members of the George Mason University community, we are committed to fostering an environment of trust, respect, and scholarly excellence. Our academic standards are the foundation of this commitment, guiding our behavior and interactions within this academic community. The practices for implementing these standards adapt to modern practices, disciplinary contexts, and technological advancements. Our standards are embodied in our courses, policies, and scholarship, and are upheld in the following principles:

- **Honesty:** Providing accurate information in all academic endeavors, including communications, assignments, and examinations.
- **Acknowledgement:** Giving proper credit for all contributions to one's work. This involves the use of accurate citations and references for any ideas, words, or materials created by others in the style appropriate to the discipline. It also includes acknowledging shared authorship in group projects, co-authored pieces, and project reports.
- **Uniqueness of Work:** Ensuring that all submitted work is the result of one's own effort and is original, including free from self-plagiarism. This principle extends to written assignments, code, presentations, exams, and all other forms of academic work.

Violations of these standards—including but not limited to plagiarism, fabrication, and cheating—are taken seriously and will be addressed in accordance with university policies. The process for reporting, investigating, and adjudicating violations is [outlined in the university's procedures](#). Consequences of violations may include academic sanctions, disciplinary actions, and other measures necessary to uphold the integrity of our academic community.

The principles outlined in these academic standards reflect our collective commitment to upholding the highest standards of honesty, acknowledgement, and uniqueness of work. By adhering to these principles, we ensure the continued excellence and integrity of George Mason University's academic community.

**Student responsibility:** Students are responsible for understanding how these general expectations regarding academic standards apply to each course, assignment, or exam they participate in; students should ask their instructor for clarification on any aspect that is not clear to them.

### **Accommodations for Students with Disabilities**

Disability Services at George Mason University is committed to upholding the letter and spirit of the laws that ensure equal treatment of people with disabilities. Under the administration of University Life, Disability Services implements and coordinates reasonable accommodations and disability-related services that afford equal access to university programs and activities. Students can begin the registration process with Disability Services at any time during their enrollment at George Mason University. If you are seeking accommodations, please visit <https://ds.gmu.edu/> for detailed information about the Disability Services registration process. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: [ods@gmu.edu](mailto:ods@gmu.edu). Phone: (703) 993-2474.

**Student responsibility:** Students are responsible for registering with Disability Services and communicating about their approved accommodations with their instructor *in advance* of any relevant class meeting, assignment, or exam.

### **FERPA and Use of GMU Email Addresses for Course Communication**

The [Family Educational Rights and Privacy Act \(FERPA\)](#) governs the disclosure of [education records for eligible students](#) and is an essential aspect of any course. **Students must use their GMU email account** to receive important University information, including communications related to this class. Instructors will not respond to messages sent from or send messages regarding course content to a non-GMU email address.

**Student responsibility:** Students are responsible for checking their GMU email regularly for course-related information, and/or ensuring that GMU email messages are forwarded to an account they do check.

### **Title IX Resources and Required Reporting**

As a part of George Mason University's commitment to providing a safe and non-discriminatory learning, living, and working environment for all members of the University community, the University does not discriminate on the basis of sex or gender in any of its education or employment programs and activities. Accordingly, **all non-confidential employees, including your faculty member, have a legal requirement to report to the Title IX Coordinator, all relevant details obtained directly or indirectly about any incident of Prohibited Conduct** (such as sexual harassment, sexual assault, gender-based stalking, dating/domestic violence). Upon notifying the Title IX Coordinator of possible Prohibited Conduct, the Title IX Coordinator will

assess the report and determine if outreach is required. If outreach is required, the individual the report is about (the “Complainant”) will receive a communication, likely in the form of an email, offering that person the option to meet with a representative of the Title IX office.

For more information about non-confidential employees, resources, and Prohibited Conduct, please see [University Policy 1202](#): Sexual and Gender-Based Misconduct and Other Forms of Interpersonal Violence. Questions regarding Title IX can be directed to the Title IX Coordinator via email to [TitleIX@gmu.edu](mailto:TitleIX@gmu.edu), by phone at 703-993-8730, or in person on the Fairfax campus in Aquia 373.

**Student opportunity:** If you prefer to speak to someone *confidentially*, please contact one of Mason’s confidential employees in Student Support and Advocacy ([SSAC](#)), Counseling and Psychological Services ([CAPS](#)), Student Health Services ([SHS](#)), and/or the [Office of the University Ombudsperson](#).