**GGS 760 – 001, (CRN 78546), Geological Remote Sensing, Fall Semester 2016 - Credit Hours: 3**

**Course Syllabus**

**GGS 760 – Geological Remote Sensing** will provide students with in-depth knowledge of the concepts, principles, and methods of applying remotely sensed imagery and information of the Earth from a variety of sensing modalities for geological, geophysical, and geochemical applications. The course will consist of lectures, class discussions, and hands-on data analysis. Topics to be covered:

1. Introduction to geological remote sensing and the course
2. Physical principles of remote sensing
3. Geological applications – overview
4. Spectra of rocks, minerals, and soils
5. High-resolution photography, geometric aspects of photographs
6. Multispectral imaging systems – reflective and emissive; ground, air, and space
7. Hyperspectral imaging systems – reflective and emissive; ground, air, and space
8. Light detection and ranging (lidar)
9. Microwave sensing: radar/synthetic aperture radar (SAR)/SAR interferometry
10. Geophysical methods: aeromagnetics, gravimetry, resistivity
11. Fusion of data/imagery/information
12. Advanced sensing methods in the lab/through the microscope
13. Vegetation remote sensing, geobotany
14. Advanced sensing down the borehole and of cores

Each topic above will be presented in the context of one or more geological applications. Each lecture during the semester will begin with the discussion of a published paper demonstrating an aspect of applied geological remote sensing. There will also be significant hands-on analysis of remotely sensed data.

**Required Materials:** Student license of the ENVI® software package (ENVI + IDL); v5.3 or v5.x; see: (http://www.harrisgeospatial.com/Industries/Academic/Students/StudentLicenses.aspx)

**Textbook:** Remote Sensing for Geoscientists: Image Analysis and Integration, 3rd ed.by Gary L. Prost (2014) CRC Press, 702 p.[[1]](#footnote-1)

**Grading:** Mid-Term Take-Home Exam: 20%; Final Exam (Take-Home): 20%; Semester project: 30%; Homework Assignments – 20%; Class Participation and Group Discussion – 10%

**Instructors:** Dr. Ron Resmini, Office: 2212 Exploratory Hall, Office Hours: Wednesday, 3:30-4:30 p.m. or by appointment, e-mail: rresmini@gmu.edu v: 703-470-3022 (voice and text)

**Class:** Fairfax campus, Exploratory Hall, room 2312, Wednesdays, 4:30 p.m. to 7:10 p.m.

 First day of class: 31st of August and last day of class: 20th of December, 2016.

1. [http://www.amazon.com/Remote-Sensing-Geoscientists-Analysis-Integration/dp/1466561742/ref=sr\_1\_17?s=books&ie=UTF8&qid=1459087576&sr=1-17&keywords=remote+sensing+CRC](http://www.amazon.com/Remote-Sensing-Geoscientists-Analysis-Integration/dp/1466561742/ref%3Dsr_1_17?s=books&ie=UTF8&qid=1459087576&sr=1-17&keywords=remote+sensing+CRC) [↑](#footnote-ref-1)