

## GG5 562: Photogrammetry (CRN 18123)

Spring 2018: Thursday 7:20-10:00 pm Exploratory Hall 2103

J. Chris McGlone, Ph.D.

[jmcglon2@gmu.edu](mailto:jmcglon2@gmu.edu) Office hours by appointment.

**Recommended references:** (not required)

Wolf, P.R., Dewitt, B.A., Wilkinson, B.E., *Elements of Photogrammetry With Applications in GIS*, Fourth Edition, McGraw-Hill, 2014.

McGlone, J. C., editor, *Manual of Photogrammetry, Sixth Edition*, American Society for Photogrammetry and Remote Sensing, 2013. (Discounted for student ASPRS members—contact the local student chapter of the ASPRS or me for information).

**Prerequisites:** Some familiarity with elementary vector and matrix algebra and statistics will be useful, although I will give a review of the required material.

**Course overview:** We will cover single and multiple image geometry and the mathematical modeling of the imaging process for the photogrammetric operations of resection, intersection, and block adjustment. Photogrammetric products such as orthoimages, along with stereo elevation and feature extraction, will be discussed and will also be the subject of laboratory work. We will briefly discuss digital imagery and digital image processing as it relates to photogrammetry. Computer vision and photogrammetry have become closely related in recent years, so we will cover computer vision techniques currently in use in the photogrammetric community. We will cover project planning for aircraft, satellite, terrestrial, and drone projects.

### Grading:

Homework: 40%

Midterm: 30%

Final : 30%

### Approximate schedule:

Date	Topic	HW	Lab
1/25	L 1: Introduction, history, applications L 2: Optics	1	
2/1	L 3: Sensors and cameras	2	
2/8	L 4: Single and multiple image geometry	3	
2/15	L 5: Math: vectors, matrices, and least squares	4	Stereo viewing and elevation extraction
2/22	L 6: World and image coordinate systems, interior/exterior orientation	5	
3/1	L 7: Analytical photogrammetry		
3/8	L 8: Triangulation/ Midterm review		Set up/run block adjustment
3/15	<b>No class-spring break</b>		
3/22	<b>Midterm</b>		
3/29	Triangulation (continued)		Run/evaluate block adjustment
4/5	L 9: Mapping products and GIS		Make orthoimage
4/12	L 10: Digital image processing		Image processing operations
4/19	L 11: Photogrammetry and computer vision		Auto feature extraction
4/26	L 12: Multi-view photogrammetry/SFM		Multi-view project
5/3	L 13: Project planning/ Final review		Project planning exercise
<b>5/10</b>	<b>Final exam 7:30-10:15</b>		

## Policies

**Homework** is expected to be individual work, unless otherwise specified.

**Extra credit:** I do not give extra credit projects.

**Electronic devices (such as laptops, cell phones, etc.):** please be respectful of your peers and your instructor and do not engage in activities that are unrelated to class. Such disruptions show a lack of professionalism and may affect your participation grade.

**Accommodations for disabilities:** If you have a learning or physical difference that may affect your academic work, you will need to furnish appropriate documentation to the [Office for Disability Services](#). If you qualify for accommodation, the [ODS](#) staff will give you a form detailing appropriate accommodations for your instructor.

**Academic integrity:** GMU is an Honor Code university; please see the [Office for Academic Integrity](#) for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

**Privacy:** Students must use their MasonLIVE email account to receive important University information, including messages related to this class. See <http://masonlive.gmu.edu> for more information.