

GG5 562: Photogrammetry Spring 2017

J. Chris McGlone, Ph.D.

Tuesday 7:20-10:00 pm Exploratory Hall 2312
3 credit hours

Email: jmcglon2@gmu.edu (email is the preferred method of communication). Office hours are by appointment. Before or after class will usually be best.

Recommended references: (not required)

McGlone, J. C., *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).

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

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

Grading:

Homework: 40%

Midterm: 30%

Final (comprehensive): 30%

Approximate schedule:

| | Topic | Note |
|-------------|---|----------------|
| 1/24 | Introduction, history, applications | |
| 1/31 | Single image geometry | |
| 2/7 | Geometry of multiple images | |
| 2/14 | Optics and sensors | |
| 2/21 | Math: vectors, matrices, and least squares | |
| 2/28 | World and image coordinate systems, interior/exterior orientation | |
| 3/7 | Analytical photogrammetry (collinearity equations, resection, intersection) | Midterm review |
| 3/14 | No class-spring break | |
| 3/21 | Midterm | |
| 3/28 | Triangulation | |
| 4/4 | Mapping products and GIS | |
| 4/11 | Digital imagery and digital image processing | |
| 4/18 | Computer vision and photogrammetry | |
| 4/25 | Close-range photogrammetry | |
| 5/2 | Project planning | |
| 5/16 | Final exam 7:30-10:15 | |

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.