

Digital Photogrammetric Systems, CE59700
 On-campus: PTR,46282 - Distance: EPE,47698
 Fall 2010, Meeting 4:30-5:45, POTR 268
 Syllabus and Schedule

SESSION NO.	DATE	LECTURE TOPIC	TEXTBOOK REF.
1	Tu 8/24	Introduction, matrix, vector algebra, Matlab, programming, Software Remote, Photoshop, Leica Photogrammetry Suite, data	Ch. 1, A.2,A.3
2	Th 8/26	Optics, radiometry	3.1 - 3.2.12, 3.4, 6.1.2
3	Tu 8/31	Detectors, film, CCD, Bayer filter	3.3
4	Th 9/2	Camera architecture, pinhole, frame, perspective, pushbroom, whiskbroom, relief displacement	2.1 – 2.3, 2.5, 3.5 - 3.7
5	Tu 9/7	Coordinate systems, homogeneous coordinates, rotations, rotation matrix, rotation parameters	2.4, 4.2, 4.4, A.4.2, 9.3.5, E.2, G.1.3
6	Th 9/9	Rotations, sequential rotations, extraction of sequential rotation parameters, collinearity equations	4.4, 4.5, A.4, E
7	Tu 9/14	Camera calibration reports, commercial approaches to calibration, 4,6 parameter transformations for inner orientation	3.8, 4.3, 5.1 – 5.2, A.4
8	Th 9/16	Image coordinate refinement, object space coordinates, map projections	4.2.2, 5.2, A.7
9	Tu 9/21	Image coordinate refinement, 8 parameter transformation	4.1.4, 4.3, 5.2, 9.4, A.5, B.6, C.2
10	Th 9/23	DLT (direct linear transformation), least squares	9.3.2 – 9.3.4, B
11	Tu 9/28	More least squares	B
12	Th 9/30	Non-linear least squares, resection, error propagation	5.3, A.6, B, C
13	Tu 10/5	Linearization of the collinearity equations	C.3
14	Th 10/7	Intersection, color representation, interpolation	5.5, 6.2, 6.3
15	Th 10/14	Interpolation, rectification, orthorectification, true ortho	6.3, 8.1.3, 8.2.3
16	Tu 10/19	Midterm Exam	
17	Th 10/21	Bundle block adjustment, relative orientation by coplanarity	5.8.3, 5.10, 5.11, 4.5.3, C.4
18	Tu 10/26	Pairwise rectification, absolute	5.7, 7.3.2, 7.2.5

		orientation, stereo workstation architecture	
19	Th 10/28	Bundle block adjustment with self calibration (added parameters)	5.8.3, 5.4, 5.11, 5.12, 3.2.8, 9.4
20	Tu 11/2	Flight planning, stereoscopy, parallax, overlap, B/H	2.7, 5.10, 8.6
21	Th 11/4	Relative orientation by essential and fundamental matrices	4.5.3, 4.5.4, 5.6
22	Tu 11/9	Matching, cross correlation, frequency domain methods	6.6.4.8
23	Th 11/11	Linear features, minimal constraints, inner constraints	D, B.8 , 4.5.2
24	Tu 11/16	3D modeling, CAD collection, buildings and objects, VRML, visualization	8.2.2, 9.7.2
25	Th 11/18	Flight, mission planning, GPS in aircraft, control point signaling	5.10, 8.6
26	Tu 11/23	Least squares matching, VLL, DEM generation	6.6.4.8
27	Tu 11/30	DEMs, TINs, TIN generation, constrained TIN (breaklines)	8.2.1
28	Th 12/2	Automation, edges, interest points, Hough transformation	6.6.4.1 – 6.6.4.3, 6.6.4.6
29	Tu 12/7	Visualization and rendering algorithms, CGI	8.2, 8.4, 6.7
30	Th 12/9	Statistical pattern recognition, classification	10
31	TBD	Final Exam	

Notes:

- Text: *Introduction to Modern Photogrammetry*, Mikhail et al, Wiley 2001, ISBN 0-471-30924-9
- October break: Oct. 11,12
- Thanksgiving break: Nov. 24-26