CE 59700-019
CRN 12956
Digital Photogrammetric Systems
Fall 2009
Syllabus and Schedule

Session No.	Date	Lecture Topic	Textbook Ref
1	M 8/24	Course intro, matrix & vector algebra, Matlab, programming, software, data	A.3
2	W 8/26	Optics, radiometry, aberrations, rayleigh resolution, scale, refraction, reflection	2.2, 3.1, 3.2, 3.4
3	F 8/28	Film, detector, CCD, bayer filter, color, digital image, histogram	3.3, 6.1, 6.2
4	M 8/31	Camera obscura, pinhole, frame geometry, perspective, vanishing point, pushbroom, whiskbroom, relief displacement, GSD	2.1, 2.2, 2.3, 3.5
5	W 9/2	Coordinate systems: object, image, homogeneous coordinates, rotations, rotation matrix, 2D, 3D, parameters	2.4, 4.2, 4.4, A.4.2, E.2
6	F 9/4	Euler angles, direction cosines, axis-angle, quaternions	4.4, E.2
	M 9/7	No class – Labor Day	
7	W 9/9	Coordinate transformations, 4,6,8,7-par, polynomial, conformal polynomial	A.4, A.5
8	F 9/11	Map projections, UTM, SPC: TM, LC, projection parameters	A.7
9	M 9/14	Camera calibration, inner orientation	3.2.7, 3.2.8, 3.8.1, 4.2.1, 4.3, 9.4, 9.5
10	W 9/16	Image coordinate refinement: lens distortion, atmospheric refraction	3.2.8, 4.3, 5.2, 9.4
11	F 9/18	Collinearity equations, G2I, I2G, coordinates, directions	4.5.1, 5.8, 9.3
12	M 9/21	Direct Linear Transformation, 8-par, extracting parameters from 8-par	4.1.4, 4.5.6, 9.3.2, A.5
13	W 9/23	Oblique, tilted image, variable scale	2.2
14	F 9/25	Space resection, gimbal lock, critical geometries, how to avoid	5.3, A.4.2
15	M 9/28	Space intersection, linear version	5.5
16	W 9/30	Color models, transformations, pan sharpening, histogram operations	6.2
17	F 10/2	Interpolation and resampling, NN, BL, CC, DIP: edge detection	6.3, 6.6.4
18	M 10/5	Simple rectification	8.1.3, 8.2.3
19	W 10/7	Ortho-rectification, true ortho	8.2.3
20	F 10/9	Bundle block adjustment 1	5.8.3

	M 10/12	No class – October break (12 & 13)	
21	W 10/14	Bundle block adjustment 2	5.8.3
22	F 10/16	**Midterm Exam**	
23	M 10/19	Epipolar geometry, image normalization, pairwise rectification	2.8, 7.3.2
24	W 10/21	Stereo: anaglyph, polarization, flicker, auto	7.3.2
25	F 10/23	Coplanarity equation, relative orientation	4.5.3
26	M 10/26	Alternate form of coplanarity equation, 8 point algorithm, absolute orientation	4.5.4
27	W 10/28	Parallax, overlap, B/H, b/h, FMC	2.6
28	F 10/30	Commercial mapping software tools, LPS, Socket Set, model setup	7.3
29	M 11/2	Map compilation, feature extraction, input to GIS	7.2.5, 7.3
30	W 11/4	Close range photogrammetry 1	9
31	F 11/6	Close range photogrammetry 2	9
32	M 11/9	3D CAD collection, 3D visualization	8.4
33	W 11/11	VRML, rendering, animation	8.4
34	F 11/13	Flight, mission planning	2.7, 8.6
35	M 11/16	GPS in aircraft, IMU, INS	5.10
36	W 11/18	Correlation, matching, DEM generation	6.2.2.1, 6.6.4.8
37	F 11/20	Least squares matching	-
38	M 11/23	DEM organization, USGS, DTED	8.2.1
	W 11/25	No class – Thanksgiving (25,26,27)	
	F 11/27	No class – Thanksgiving	
39	M 11/30	TIN, TIN generation, constrained TIN	8.2.1
40	W 12/2	Interest points (corner detection)	6.6.4.6
41	F 12/4	Line detection: Hough transform	-
42	M 12/7	Statistical pattern recognition 1 (classification)	10
43	W 12/9	Statistical pattern recognition 2	10
44	F 12/11	Computer vision	6.6
45	TBD	**Final Exam**	