

CE 59700-029  
CRN 12966  
**Adjustment of Geospatial Observations**  
Fall 2009  
Syllabus and Schedule

Session No.	Date	Lecture Topic	Textbook Ref
1	M 8/24	Course intro, errors: random, systematic, blunder, concept of adjustment, modeling, vocabulary, precision, accuracy, condition equation, weight	1.1, 1.2, 3.1, 3.2, 3.3
2	W 8/26	Indirect observations, LS objective function, longhand solution, linear examples: regression, leveling, angle figures, length figures	3.4, 4.1, 4.3
3	F 8/28	Linear examples	Ch3 & ch4 problems, 3.4,4.1, 4.3
4	M 8/31	Constrained minimization, lagrange multipliers, observations only, longhand solution	4.1, 4.4
5	W 9/2	Linear examples: observations only	Ch3 & ch4 problems, 3.4, 4.1, 4.4
6	F 9/4	Matlab tutorial, programming, graphics, gui, linear independence, dependence, subspaces, condition number, rank, solution of linear system, inverse	A
	M 9/7	No class – Labor Day	
7	W 9/9	Matrix derivation, indirect observations	4.3
8	F 9/11	Matrix derivation observations only, variable name conventions	4.4
9	M 9/14	Curve fitting, surface fitting, spline	-
10	W 9/16	Derive 2S rotation matrix, linear coordinate transformations, 2D conformal, affine, polynomial	-
11	F 9/18	Nonlinear equations, newton iteration, 1D, nD, jacobian	2.2, 4.3, 4.4
12	M 9/21	Partial differentiation, approximation, convergence	2.2
13	W 9/23	Nonlinear examples	Ch4 problems
14	F 9/25	Nonlinear examples, matlab symbolic processing	4,10
15	M 9/28	2D/3D ranging	10.2, 10.5
16	W 9/30	Probability, density, distribution, normal, multivariate normal	5

17	F 10/2	Random variables, expectation, moments, mean, variance, standard deviation	5
18	M 10/5	Example distributions: normal, mvn, F, Chi-sqr, t, critical values, tables, matlab functions, calculator	5
19	W 10/7	Covariance, covariance matrix, correlation coefficient, general error propagation law	5.7, 5.8, 6.1, 6.2
20	F 10/9	Error propagation, covariance propagation, examples	6.1, 6.2, 6.3
	M 10/12	No class – October break (12 & 13)	
21	W 10/14	Ind. obs, Qll, Qdd, Qvv, Qlhlh	6.5
22	F 10/16	Obs. Only, Qll, Qvv, Qlhlh	6.6
23	M 10/19	<b>Midterm Exam</b>	
24	W 10/21	Confidence interval, hypothesis test, global test, Chi-sqr, F	8
25	F 10/23	Eigenvalue, eigenvector	8.13
26	M 10/26	Confidence region, error ellipse	8.13
27	W 10/28	CE/LE numerical integration	-
28	F 10/30	Plane surveying techniques: traverse, triangulation, trilateration, azimuth, angle, direction observation	10
29	M 11/2	Plane surveying techniques	10
30	W 11/4	Generic approach to 2D network adjustment	10
31	F 11/6	Pseudo LS, 8-par transformation, RPC	-
32	M 11/9	3D rotation matrix, rotation parameters	-
33	W 11/11	General LS, mixed model, matrix derivation, error prop, Qvv, Qdd, Qlhlh	9
34	F 11/13	General LS counting	9
35	M 11/16	General LS examples: curve fit (both coords obs), coord transf, 3D conformal coord transf (lidar merge)	9
36	W 11/18	GPS receiver signal processing acquisition	-
37	F 11/20	GPS receiver signal processing navigation message & pseudorange observation	-
38	M 11/23	GPS pseudorange adjustment, RINEX	-
	W 11/25	No class – Thanksgiving (25,26,27)	
	F 11/27	No class – Thanksgiving	
39	M 11/30	Error propagation, DOP	-
40	W 12/2	Preanalysis, network design, adjustment evaluation	7
41	F 12/4	Robust estimation: IRLS, L1-min, data snooping, redundancy number	-
42	M 12/7	Robust estimation	-
43	W 12/9	Commercial software: starnet	-
44	F 12/11	Modern software development tools: Matlab	-

		GUI, VB, VC++	
45	TBD	<b>Final Exam</b>	