

Week OF		Lectures					Assignments				Readings
#	Begin [1]	Module #	Title	Lesson	Topic	Duration (min) [2]	AS #	Title	Release	Due	Text
		DUE DATES provided here for just for planning purposes. ACTUAL due dates are in CANVAS. Time Zone for this class is Atlanta TIME									
1	14-Jan	1A	Introduction	1A-L1	Introduction	42		Python Setup			SZ: 1.1, 1.2
		2A	Linear image processing	2A-L1	Images as functions	44					
				2A-L2	Filtering	24					FP: 4
				2A-L3	Linearity and convolution	34					
				2A-L4	Filters as templates	13					
				2A-L5	Edge detection: Gradients	27					FP: 5.1, 5.2
				2A-L6	Edge detection: 2D operators	19					
2	19-Jan	2B	Hough Transforms	2B-L1	Hough transform: Lines	36	1	Images as Functions	22-Jan	1-Feb	FP: 10.1
				2B-L2	Hough transform: Circles	13					
				2B-L3	Generalized Hough transform	16					
		2C	Frequency domain analysis	2C-L1	Fourier transform	36					FP: 4
				2C-L2	Convolution in frequency domain	22					
				2C-L3	Aliasing	35					
3	25-Jan	3A	Camera models	3A-L1	Cameras and images	33	2	Traffic Lights and Signs	29-Jan	15-Feb	FP: 1, 2.1-2.2
				3A-L2	Perspective imaging	26					
		3B	Stereo geometry	3B-L1	Stereo geometry	26					FP: 7
				3B-L2	Epipolar geometry	11					
				3B-L3	Stereo correspondence	29					
4	1-Feb	3C	Camera calibration	3C-L1	Extrinsic camera calibration	24					FP: 8
				3C-L2	Intrinsic camera calibration	16					
				3C-L3	Calibrating cameras	31					
5	8-Feb	3D	Multiple views	3D-L1	Image to image projections	10	3	Adventures in AR	12-Feb	1-Mar	
				3D-L2	Homographies and mosaics	33					
				3D-L3	Projective geometry	14					
				3D-L4	Essential matrix	22					
				3D-L5	Fundamental matrix	37					
6	15-Feb	4A	Feature detection	4A-L1	Introduction to "features"	13					FP: 5.3-5.4; SZ: 4
				4A-L2	Finding corners	39					
				4A-L3	Scale invariance	23					
		4B	Feature descriptors	4B-L1	SIFT descriptor	27					FP: 5.4; SZ: 4.1
				4B-L2	Matching feature points (a little)	16					
		4C	Feature robustness	4C-L1	Robust error functions	31					
				4C-L2	RANSAC	33					FP: 10.2-10.4
7	22-Feb	5A	Photometry	5A-L1	Photometry	35	4	Motion Detection	26-Feb	15-Mar	FP: 2.1-2.2
		5B	Lightness	5B-L1	Lightness	26					
		5C	Shape from shading	5C-L1	Shape from shading	34					
8	1-Mar	6A	Motion	6A-L1	Introduction to motion	16					FP: 9, 10.6
		6B	Optical flow	6B-L1	Dense flow: Brightness constraint	24					
				6B-L2	Dense flow: Lucas and Kanade	17					
				6B-L3	Hierarchical LK	33					
				6B-L4	Motion models	24					FP: 11.3

Week OF		Lectures					Assignments				Readings			
#	Begin [1]	Module #	Title	Lesson	Topic	Duration (min) [2]	AS #	Title	Release	Due	Text			
9	8-Mar	7A	Tracking	7A-L1	Introduction to tracking	14	5	Object Tracking and Pedestrian Detection	12-Mar	29-Mar				
		7B	Parametric models	7B-L1	Tracking as inference	21								
				7B-L2	The Kalman filter	36								
10	15-Mar	7C	Non-parametric models	7C-L1	Bayes filters	23								
				7C-L2	Particle filters	17				FP: 11.5				
				7C-L3	Particle filters for localization	24								
				7C-L4	Particle filters for real	15								
11	22-Mar	7D	Tracking considerations	7D-L1	Tracking considerations	27	6	Classification	26-Mar	12-Apr				
		8A	Recognition / Classification	8A-L1	Introduction to recognition	21		Final Project Topic release	26-Mar		FP: 16			
		8B	Classification: Generative models	8B-L1	Classification: Generative models	28					FP: 15.1-15.2			
				8B-L2	Principle Component Analysis	48					FP: 16.1.5			
				8B-L3	Appearance-based tracking	26								
12	29-Mar	8C	Classification: Discriminative models	8C-L1	Classification: Discriminative models	27								
				8C-L2	Boosting and face detection	27								
				8C-L3	Support Vector Machines	51								
				8C-L4	Bag of visual words	14				FP: 20.1				
13	5-Apr	8D	Action recognition	8D-L1	Introduction to video analysis	24	7	Final Project	26-Mar	5-May				
				8D-L2	Activity recognition	32								
				8D-L3	Hidden Markov Models	46								
14	12-Apr	9A	Color spaces and segmentation	9A-L1	Color spaces	36								
				9A-L2	Segmentation	18								
				9A-L3	Mean shift segmentation	18								
				9A-L4	Segmentation by graph partitioning	13								
15	19-Apr	9B	Binary morphology	9B-L1	Binary morphology	37								
		9C	3D perception	9C-L1	3D perception	34								
		10A	The retina	10A-L1	The retina	38								
		10B	Vision in the brain	10B-L1	Vision in the brain	27								
16	26-Apr		Last Week					FINAL EXAM	28-Apr	5-May				

[1] Monday

[2] (min.)