OPTI 340, Lens Design (2014) HO#2 (Updated, Jan 14 Y. Takashima

	Week		Class	Topics	Contents	Final Project Milestones	Reading Assignment *	HW	Design Project Due
Jan	1	15-Jan W	1	Introduction, Overview of the course	Course structure, Optical design procedure, Design example	CodeV License Form Distributed	MJK Ch. 1		
		17-Jan F	2	Ray and wave front	Ray and Wave front, Optical Path Length, Huygens' Principle, Fermat's Principle	CodeV License Form Collected			
	2	20-Jan M	No Class	MLK Holiday	MLK Holiday				
		22-Jan T	3	Review of Gaussian Optics (1)	Sign conventions, Graphical ray tracing		MJK Ch. 2		
		22-Jan W	4	Review of Gaussian Optics (2)	Ray Matrices, Cardinal points, Focal length				
		24-Jan F	5	Review of Gaussian Optics (3)	Chief ray and Marginal ray, Depth of field, Field of view				
		27-Jan M	6	Exact Ray Trace Method	Fedor's and U-Q method, Single ray trace by CodeV		MJK Ch. 3, Fedor's paper	HW#1 out	DP#1 out
		28-Jan T	7	Exact Ray Trace Method					
		29-Jan W	8	Wave front expansions (1)	Coordinate system, Aberration coefficients		MJK Ch. 4		
		31-Jan F	9	Wave front expansions (2)	Coordinate system, Aberration coefficients				
	4	3-Feb M	10	Introduction to CodeV (BY TA)				HW#1 Due, HW#2 Out	DP#1 Due, DP#2 Out
		4-Feb T	11	No Discussion Session					
		5-Feb W	12	Aberration measures	Spot diagrams, Ray Intercept curve and wavefront error				
Feb		7-Feb F	13	1st order aberrations (1)	Defocus, Wave front and Ray aberrations, wave OPD errors				
	5	10-Feb M	14	1st order aberrations (2)	Tilt, wave front and ray aberrations, wave OPD errors		J&W Ch. 9	HW#2 Due, HW#3 Out	DP#2 Due, DP#3 Out
		11-Feb T	15	3rd order monochromatic aberrations,	Overview, Analysis and synthesis of optical system, Applicability, Derivation of SA		J&W Ch. 9		
		12-Feb W	16	Spherical aberration (1)	Lens bending, Aplanatic surface, Asphere		MJK Ch 6.1, 6.2.1, 6.2.2, MJK Ch 7.1, 7.2,7.3		
		14-Feb F	17	Spherical aberration (2)	SA and Defocus				
	6	17-Feb M	18	Spherical aberration (3)	Balancing 3rd and 5th order SA, Spherochromatism			HW#3 Due, HW#4 Out	DP#3 Due, DP#4 Out
		18-Feb T	19	Spherical aberration (4)			MJK Ch 6.2.2, 7.3.2		
		19-Feb W	20	Coma (1)	Minimizing coma and spherical aberration		MJK Ch 6.2.2, 7.3.2		
		21-Feb F	21	Coma (2)	Aplanatic surface, High NA lens design		MJK Ch 6.5		
	7	24-Feb M	22	Midterm Review					
		25-Feb T	23	Midterm I (in class)					
		26-Feb W	24	Astigmatism (1)	Tangential and Saginaw focus. Effects of Astigmatism on imaging		MJK Ch 7.3.3	HW#4 Due, HW#5 Out	DP#4 Due, DP#5 Out
		28-Feb F	25	Astigmatism (2)	Astigmatism Continued				
	8	3-Mar M	26	Introduction to CodeV (BY TA)			MJK Ch 7.3.4		
		4-Mar T	27	Field curvature	Petzval sum, Field flattener				
		5-Mar W	28	Distortion	Distortion compensation			HW#5 Due, HW#6 Out	DP#5 Due, DP#6 Out
Mar		7-Mar F	29	Chromatic Aberration (1)	Dispersion of Glass, Axial and lateral chromatic aberrations		MJK Ch 5		
	9	10-Mar M	30	Chromatic Aberration (2)	Cemented doublet, Air-spaced doublet		MJK Ch 8		
		11-Mar T	31	Chromatic Aberration (3)	Secondary spectrum				
		12-Mar W	32	Chromatic Aberration (4)	Burried Surfaces			HW#6 Due, HW#7 Out	DP#6 Due, DP#7 Out

		14-Mar	F	33	Image Evaluation (1)	Fourier Optics (1)	Final Project Pre proposal (Topic and Teaming)	J. W. Goodman/ W. J. Smith	
	10	17-Mar		**No Class**					
		18-Mar		**No Class**					
		19-Mar		**No Class**					
		21-Mar		**No Class**					
	11	24-Mar	M	34	Image Evaluation (2)	Coherent MTF			
		25-Mar	T	**Project MTG (1)**			#1 Teaming, Proposal Report Due		
		26-Mar	W	35	Image Evaluation (3)	Coherent MTF		HW#7 Due, HW#8 Out	DP#7 Due, DP#8 Out
		28-Mar	F	36	Image Evaluation (4)	Incoherent MTF			
	12	31-Mar	M	37	Aberration Tolerances (1)	MTF			
		1-Apr	T	**Project MTG (2)**			#2 MRD, Tech Spec Report Due		
		2-Apr	W	38	Aberration Tolerances (2)	Strehl Ratio		HW#8 Due, HW#9 Out	DP#8 Due, DP#9 Out
		4-Apr	F	39	Aberration Tolerances (3)	Zernike Polynomials			
Apr		7-Apr	M	40	Midterm Review (by TA)				
	13	8-Apr	T	**41 Midterm II (in Class)**					
		9-Apr	W	**Project MTG (3)**			# 3,1st order solutions Report Due		
		11-Apr	F	**42**	Tolerance (1)				
	14	14-Apr	M					HW#9 Due, HW#10 Out	DP#9 Due, DP#10 Out
		15-Apr	T	**Project MTG (4)**			#4, 3rd order solutions Report Due		
		16-Apr	W	43	Tolerance (2)				
		18-Apr	F						
	15	21-Apr	M						
		22-Apr	T	**Project MTG (5)**			#5, Initial Optimization Report Due		
		23-Apr	W	44	Polarization in Optical Design (1)				DP#11 Due
		25-Apr	F						
	16	28-Apr	M						
		29-Apr	T	**Project MTG (6)**			#6, Optimization Report Due		
		30-Apr	W	45	Polarization in Optical Design (2)				
		2-May	F						
	17	5-May	M	**Project MTG (7)**			#7, Tolerance Report Due		
		6-May	T	46	Final Exam/Class presentation (1)				
May		7-May	W	47	Final Exam/Class presentation (2)				
								* Additional reading will be assigned.	