OPTI 340, Lens Design (2015) HO#2 (Updated, Jan 12 Y. Takashima

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

		13-Mar	F	33	Image Evaluation (1)	Fourier Optics (1)	Final Project Pre proposal (Topic and Teaming)	J. W. Goodman/ W. J. Smith	
	10	16-Mar		**No Class**					
		17-Mar		**No Class**					
		20-Mar		**No Class**					
		20-Mar		**No Class**					
	11	23-Mar	M	34	Image Evaluation (2)	Coherent MTF			
		24-Mar	T	**Project MTG (1)**			#1 Teaming, Proposal Report Due		
		25-Mar	W	35	Image Evaluation (3)	Coherent MTF		HW#7 Due, HW#8 Out	DP#7 Due, DP#8 Out
		27-Mar	F	36	Image Evaluation (4)	Incoherent MTF			
	12	30-Mar	M	37	Aberration Tolerances (1)	MTF			
		31-Mar	T	**Project MTG (2)**			#2 MRD, Tech Spec Report Due		
		1-Apr	W	38	Aberration Tolerances (2)	Strehl Ratio		HW#8 Due, HW#9 Out	DP#8 Due, DP#9 Out
		3-Apr	F	39	Aberration Tolerances (3)	Zernike Polynomials			
Apr		6-Apr	M	40	Midterm Review (by TA)				
	13	7-Apr	T	**41**	**Midterm II (in Class)**				
		8-Apr	W	**Project MTG (3)**			# 3,1st order solutions Report Due		
		10-Apr	F	**42**	Tolerance (1)				
	14	13-Apr	M					HW#9 Due, HW#10 Out	DP#9 Due, DP#10 Out
		14-Apr	T	**Project MTG (4)**			#4, 3rd order solutions Report Due		
		15-Apr	W	43	Tolerance (2)				
		17-Apr	F	43	Tolerance (3)				
	15	20-Apr	M	44	Polarization in Optical Design (1)				
		21-Apr	T	**45**	Polarization in Optical Design (2)				
		22-Apr	W	**Project MTG (5)**			#5, Initial Optimization Report Due		DP#11 Due
		24-Apr	F						
	16	27-Apr	M						
		28-Apr	T	**Project MTG (6)**			#6, Optimization Report Due		
		29-Apr	W	45	Polarization in Optical Design (3)				
		1-May	F						
	17	4-May	M	**Project MTG (7)**			#7, Tolerance Report Due		
		5-May	T	46	Final Exam/Class presentation (1)				
May		6-May	W	47	Final Exam/Class presentation (2)				
								* Additional reading will be assigned.	