THE UNIVERSITY OF TEXAS AT EL PASO
COLLEGE OF SCIENCE
DEPARTMENT OF PHYSICS

Course #:	PHYS 3323 CRN 23306
Course Title:	Physical Optics
Credit Hrs:	3.0
Term:	Spring 2015
Course Meetings & Location:	MW 12:00 – 1:20 p.m., Physical Science Building 220
Prerequisite Courses:	-
Course Fee: (if applicable)	-
Instructor:	Dr. Chunqiang Li
Office Location:	PSCI 221E
Contact Info:	Phone #: (915) 747-7537
	E-mail: cli@utep.edu
	Fax #: (915) 747-5447
Office Hrs:	Monday 11:00 am– 12:00 pm or by appointment
Textbook(s), Materials:	Main textbook: **UNIVERSITY PHYSICS with Modern Physics**, by Hugh D. Young and Roger A. Freedman, 13th Ed., Pearson-Addison Wesley. The textbook is bundled together with the online resource registration package**. REGISTER FOR ONLINE HOMEWORK IMMEDIATELY. EACH STUDENT WILL NEED HIS OWN REGISTRATION PACKAGE FOR THE HOMEWORK**. Since you are going to read each chapter anyway, please try to complete the weekly reading before lecture. Lectures will be more effective and you will be ready to ask questions on topics that may have not been clear from the reading. Other materials: For the last part of the course consisting of information about *Lasers*, and *Fiber Optics* the instructor will provide additional required materials
Course Objectives (Learning Outcomes):	The objective of PHYS 3323 course is to give you a perspective for understanding and learning for yourself that all the theories and laws of physical optics do "work" and have various applications. By "work" I mean that the real physical world around us does indeed behave in the way described by the theories and laws.
Grading Policy:	Grades in this course will be based on your scores on one midterm exam, a final exam (comprehensive; but with emphasis on the last part of the course, which will emphasize knowledge about lasers and optical imaging), quizzes & attendance, and homework assignments.

2 Midterm exams:	40%
Final exam:	40% (comprehensive)
Homework score:	20%

Course Activities/Assignments:	**Home work** Supplementary reading, answering questions, and solving problems will be assigned in advance in the lecture. Also, our textbooks come with problems at the end. Homework should be completed every Friday. It is essential that students become well versed in problem solving methods, which means developing the writing skills to set up a problem, including diagrams and mathematical manipulation to achieve the final answer. A numerical score will be assigned for each homework set based on graded and counted problems. Feel free to form study groups with your classmates and seek help from any lecture instructor during his or her office hours as you attempt to solve the problems. Make sure that you understand the solutions and write them up yourself. There is a strong correlation between homework scores and exam scores! **Exams** Exams will consist of problems very similar to the worked example problems in the text and the assigned homework problems. Exams will be strictly closed-book. You should bring with you a pocket calculator to work out the answers to numerical problems: make sure the battery is charged! No cell phones allowed in the exams! Full credit on exams will be awarded for complete solutions including drawing a figure and deriving necessary relations if appropriate, and for numerically accurate answers with units. Partial credit may be given for correct derivations if the answer is numerically incorrect due to arithmetic errors. No credit will be given for relations written down at random or for numerical answers that are not supported by a reasonably complete derivation. The best way to prepare for the exams is to study the example problems and work out the assigned homework problems regularly. You should work as many additional problems from the text as you can: this is the best way to ensure your understanding of the material.
Make-up Policy:	An extension of the due date for the homework as well as the make-up of missing exams will be granted only in extraordinary circumstances.
Attendance Policy:	No credit will be granted for just attending the class.
Academic Integrity Policy:	Please see: http://academics.utep.edu/Default.aspx?tabid=23785
Civility Statement:	• Cell phones and pagers should be turned off during class time. • When absences occur, it is your responsibility to obtain handouts and notes from your peers. When possible you will complete the activities you have missed. • Academic integrity is to be practiced at all times.

Disability Statement:	If you have a disability and need classroom accommodations, please contact the Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East Building, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass. The student is responsible for presenting to the instructor any accommodation letters and instructions.
Military Statement:	If you are a military student with the potential of being called to military service and/or training during the course of the semester, you are encouraged to contact the instructor at the beginning of the semester.
Tentative Schedule:	**MECHANICAL WAVES (Ch 15)** • Types of Mechanical Waves • Periodic Waves • Mechanical Description of a Wave • Energy in Wave Motion • Wave Interference, Boundary Conditions, and Superposition • Standing Waves on a String • Normal Modes of a String **ELECTROMAGNETIC WAVES (Ch 32)** • Maxwell's Equations and Electromagnetic Waves • Plane Electromagnetic waves and the Speed of Light • Sinusoidal Electromagnetic Waves • Energy and Momentum in Electromagnetic Waves • Standing Electromagnetic Waves **THE NATURE AND PROPAGATION OF LIGHT (Ch 33)** • The Nature of Light • Reflection and Refraction • Total Internal Reflection • Dispersion • Polarization • Scattering of Light • Huygens's Principle

GEOMETRIC OPTICS AND OPTICAL INSTRUMENTS (Ch 34)

- Reflection and Refraction at a Plane Surface
- Refection at a Spherical Surface
- Refraction at a Spherical Surface
- Thin Lenses
- Cameras
- The Eye
- The Magnifier
- Microscopes and Telescopes

INTERFERENCE (Ch 35)

- Interference and Coherent Sources
- Two-Source Interference of Light
- Intensity in Interference Patterns
- Interference in Thin Films
- The Michelson Interferometer

DIFFRACTION (Ch 36)

- Fresnel and Fraunhofer Diffraction
- Diffraction from a single slit
- Intensity in the Single-Slit Pattern
- Multiple Slits
- The Diffraction Grating
- X-ray Diffraction
- Circular Apertures and Resolving Power
- Holography

Course Schedule:	**FIBER OPTICS** • Introduction • How does fiber transmit light? • Types of fibers • Fiber modes • Attenuation in fiber • Fiber communication **LASERS** • Introduction • Energy levels in Atoms, Molecules, and Solids • Stimulated Emission and Light Amplification • Laser Systems • Longitudinal Cavity Modes • Frequency Stability • Introduction to Gaussian Beams • Derivation of Gaussian Beam Properties • Laser Cavities