



## Course Syllabus

**Course:** PHO K101 Introduction to Light and Lasers  
**Prerequisites:** High School Algebra or MAT\* K095  
**Corequisites:** MAT\* K137  
**Instructors:** Dan Courtney, George Lyman –  
 dcourtney@trcc.commnet.edu, glyman@trcc.commnet.edu  
**Office Hours:** As Posted

**Text (Optional):** Fundamentals of Light and Lasers, 2<sup>nd</sup> Edition, OP-TEC

### Course Detail:

CRN	Course #	Credits	Title	Day	Time	Date	Room
32963	PHO K101	4.00	Introduction to Light & Lasers	R	05:00 pm-07:45 pm	08/29-12/22	B209
32964	PHO K101	0.00	LAB, Intro to Light & Lasers	R	07:46 pm-09:26 pm	08/29-12/22	B209

### Course Description:

Optics is the science underlying technologies such as laser manufacturing, 3-D holograms, arthroscopic surgery, CD and DVD technology, fiber optic telecommunications and high efficiency LED lighting. In this course we will explore the nature, production and behavior of light while learning about light sources and applications in technology and nature. Hands-on activities, problem based learning projects and demonstrations are used to illustrate concepts

### Course Topics:

*Nature and Properties of Light* covers the wave and particle properties of light, light interactions, and fundamentals of laboratory safety.

*Optical Handling and Positioning* covers bulk optical materials and their properties, optical coatings and methods of coating deposition, laboratory mountings, positioning equipment, surface quality of optical components, inspection methods and procedures, and the care and cleaning of optics.

*Light Sources and Laser Safety* covers important properties of nonlaser and laser light sources, nonlaser light sources, concepts of laser safety, and laser safety standards and safety classifications.

*Basic Geometrical Optics* covers the laws of reflection and refraction, image formation with mirrors, and image formation with lenses.

*Basic Physical Optics* covers light waves and their interaction with various objects in interference, diffraction, and polarization processes.

*Principles of Lasers* covers the generation of laser light, optical cavities and modes, laser beam characteristics, and a brief survey of different types of lasers.

Link to Shared Drive - <https://drive.google.com/folderview?id=0B-0fu1O6-a22c29QcGNQLTBvdHc&usp=sharing>



**Course Format:** Classes will consist of topic discussions, classroom exercises, projects and laboratory exercises. Classes will move fluently between these activities.

**Course Grading:** Class Participation, Technical Aptitude, Laboratory Skills, Professional Attitude

**Attendance/Timeliness:** Attendance is mandatory at all class and lab sessions. Tardiness of attendance and assignments will have a significant negative impact on grading.

Do not email the instructor asking if you missed anything when absent. You did. Get the information from your lab partner or another student.

All students are also required to maintain an online learning portfolio in Digication that uses the college template. The Digication Portfolio may be separate from the Course Portfolio. Specific items may be required for upload to the Digication Portfolio. The instructor will give specific direction concerning course content for upload to the Digication Portfolio.

Other Required Course Materials: Scientific Calculator e.g. TI-30 – Calculators should be available at all times

#### TRCC EET Stated Outcomes

1. Students will practice the skills needed to work effectively in teams and as an individual.
2. Students will demonstrate the ability to use appropriate mathematical and computational skills needed for engineering technology applications.
3. Students will combine oral, graphical, and written communication skills to present and exchange information effectively and to direct technical activities.
4. Students will know of a professional code of ethics.
5. Students will describe concepts relating to quality, timeliness, and continuous improvement.
6. Students will describe how the concepts of electric circuits, electrical measurements, digital electronic devices, programmable logic circuits, electromechanical and automated systems, affect the design, maintenance, and operation of electrical systems.
7. Students will illustrate an ability to think critically and identify, evaluate and solve complex technical and non-technical problems; demonstrate creativity in designing problem solutions; and conduct and interpret experimental data and outcomes.
8. Students will recognize actions and acts of professionalism that allows them to become informed and participating citizens cognizant of ethics, civic duty, and social responsibility.
9. Students will recognize the need to be lifelong learners.

#### PHO K101 Course Outcomes

1. Mastery of Optics and Laser concepts as defined in the course syllabus
2. Knowledge of optical quantities, units and relationships
3. Demonstrate an ability to build and test optical systems
4. Demonstrate an ability to analyze and solve problems relating to basic optical systems
5. Demonstrate technician level oral and written communication skills
6. Demonstrate an ability to engage in self-directed professional development
7. Demonstrate proper professional and ethical behavior
8. Demonstrate a commitment to quality, timeliness and continuous improvement