Miami Dade College

OPT 1110 PHYSICAL AND GEOMETRICAL OPTICS

Course Description

Behavior of light energy as it passes through air, plastic, glss and water with emphasis on how light is modified by prism and curved lens surfaces. these principles relate to the efect these ophthalmic devices have in correcting the errors of human vision.

Course Competency	Learning Outcomes
Competency 1: The student will solve basic mathematical problems in ophthalmic and geometrical optics through the use of the principals of algebra and basic trigonometry as they apply to the science of optics by:	Numbers / Data
1. using the metric system to convert units of measure. 2. solving basic algebraic equations. 3. diagraming the Cartesian coordinate system and resolving basic triangular measurements. 4. using three of the trigonometric functions to solve for unknown sides and angles.	
Competency 2: The student will demonstrate an understanding of basic optics as it applies to the actions of a single ray of light through a transparent optical surface, including the laws governing reflection and refraction of light on a single surface by:	Numbers / Data
1. differentiating between refraction, reflection and absorption. 2. explaining the path a light ray takes passing through a transparent material, by the use of Snell's Law. 3. explaining hte path a light ray takes as it is reflected off of a surface.	

Competency 3: The student will be ale to diagram and solve problems proving the influence of thick and thrin prisms on the behavior of light by:	Numbers / Data
1. identifying the angles formed as a lignt ray passes through a prism. 2. describing a prism diopter. 3. differentiating between a prism diopter and degrees of deviation. 4. solving for unknown amounts of displacements through a prism.	
Competency 4: The student will describe the action of light through a curved single refracting surface and apply these principles to the optics of ophthalmic lenses for both parallel and non-parallel light by:	Numbers / Data
1. explaining the concept of ophthalmic lenses. 2. describing the action of focusing light. 3. solving unknown lens powers and focal length. 4. differentiating between lens power and vergence power.	
Competency 5: The student will define the relationship and optical properties of cylindrical lenses by:	Numbers / Data
1. explaining the physical properties of a spherical surface. 2. explaining the physical properties of a cylindrical surface. 3. differentiating between a toric surface and a spherical surface. 4. differentiating the difference between a plus cylinder lens and a minus cylinder lens.	
Competency 6: The student will demonstrate the ability to transform a lens prescription from a plus to a minus cylindrical form, from a minus to a plus cylindrical form and from a sphero-cylindrical to a crossed cylindrical form, and to be able to create a toric optical cross for any lens with any base curve by:	Numbers / Data

1. being able to diagram a plano-concave, plano-convex, bi-convex, bi-concave and a meniscus lens. 2. demonstrating the procedures used in flat transposition. 3. demonstrating the procedures used in cross cylinder transposition. 4. demonstrating the procedures used in toric transposition. 5. being able to diagram a lens using a standard optical cross.	

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