Visual Protection and Performance in a Laser Environment

I. Principles of Laser Energy
   a. Electromagnetic Spectrum
   b. Continuous vs. Pulsed

II. Laser Hazards and Classification
   a. ANSI Z136.1
      i. Class I / 1M / 2 / 2M / 3R / 3B / 4
      ii. Maximum Permissible Exposure
      iii. Accessible Emission Limit
      iv. Nominal Ocular Hazard Distance

III. Ophthalmic Impact and Absorption Bands
   a. Ultraviolet
   b. Visible
   c. Near Infrared
   d. Far Infrared

IV. Laser Environment
   a. Range Finders
   b. Target Indicators / Designators
   c. Guidance Systems
   d. Non-lethal Denial

V. Laser Damage and Dazzle
   a. Definition
   b. Importance
   c. Effects
   d. Evaluation and Management
   e. Mitigation

VI. Laser Eye Protection
   a. Passive vs Active filters
   b. Absorptive vs Reflective
   c. Performance vs Protection
   d. Air Force Laser Eye Protection (ALEP)

VII. Vision Surveillance for Laser Workers
   a. Army
   b. Navy
   c. Air Force
      i. Proposed Guidance

VIII.   Laser Injury reporting and submittal
    a. Case Reports
        i. Pulsed
        ii. Ultrashort Pulsed
        iii. Red and Green Pointers
        iv. Blue Pointers

IX.   Nominal Ocular Dazzle Distance (NODD)
    a. Capabilities
    b. Applications
    c. Future Directions

X.   Laser Hazard Analysis (LHAZ) 6.0
    a. Capabilities
    b. Application
    c. Future Directions

Course Description: A discussion of the principles of laser energy, commonly encountered laser devices, definition of laser dazzle vs. laser damage and types of laser eye protection (LEP) available will be covered. Clinical vision surveillance techniques will be discussed along with available laser injury reporting capabilities and recent case reports. Two algorithms to determine safety (Lazard Hazard Analysis) and visual performance (Nominal Ocular Dazzle Distance) in a laser environment will be introduced.

Cope Category: Public Health (PB)

Course Objectives (3/credit hour)-

Objective 1: Identify the 2 classifications of laser systems and the relative risk of retinal injury for each

Objective 2: Define the 4 applications of laser systems in an operational environment

Objective 3: Describe the Nominal Ocular Dazzle Distance algorithm and uses in laser risk estimation