**Frequently Asked Questions**

**What is Optics?**

In physics, three main categories construct the fundamental theory of light behaviors, meaning how it generates, propagates, and interact with media. These categories are Geometrical Optics, Wave Theory, and Quantum Optics theory. Optics is a part of physics that formulated these categories and studies the behavior and properties of light.

**What is Optical Engineering?**

Optical Engineering is an engineering practice of designing, creating, and defining an optical system. Optical Engineers have studied Physical science, optics, and Photonics technologies, knowing how to design, test, build, and combine optical components for image and light generation, detection, transmission, and implementation for different applications. The design of systems that control light (photons) can include the design of lenses, reflectors, light pipes, and diffraction elements for use in applications like microscopes, cameras, lighting, medical devices, projectors, night vision, thermal imaging, and many more.

Optics and Photonics involve the study of lasers, optics, and holography. The field of optics and photonics consists of the application of lasers, optical data processing, nonlinear optics, optical communications, optical computing, optical data storage, optical system design, and holography

**What does a photonics engineer do?**

Photonics Engineers specialize in designing and developing complex optical and electronics systems. They research and apply technologies to light information or light energy, such as laser or fiber optics technology. Develop optical or imaging techniques, such as optical imaging products, components with optics, image processes, signal process technologies, or optical systems.

**What is the difference between optics and photonics?**

Optics is a general area of physics covering a wide range of topics related to the study of light. Geometrical Optics, sometimes called classical optics, is primarily concerned with manipulating light using devices such as lenses, mirrors, and prisms. Photonics is a subset of the optics discipline that concentrate study and application of light based on Wave and Quantum theories of light rather than the Geometrical theory of light.

**What is Photonics Technology**

Photonics is the new science and technology of photons (light) – its generation, transmission, processing, and detection – and all applications using a wide spectrum range of light (Infrared-Visible-Ultraviolet). Electronics is the science and technology utilizing electrons. Photonics has leveraged all "electronics such as Radio, TV, telephones, DVD players, radar, avionics, welding, computers, appliances, robotics, and more in higher advanced level. Photonics enables the manufacture and function of every one of those technologies – and many more – in ways that would otherwise be impossible.

**What is Optical Design?**

The optical design is the system design that assists in visualizing an object. If an Object is too far away or too small special optics can help to collect reflected light from an object and create an image, Such as Telescope or Microscope. These types of designs are optical imaging designs. The optical design also can create a better light distribution; optical engineers can design an optical system to shape light uniform distribution of backlight for TV display or handy phones (Liquid Crystal Display) display. These types of designs are non-imaging optical systems. Any optical design that assists in controlling light (photons) may include the creation of lenses, reflectors, diffusers, light pipes, diffraction elements for use in cameras, lighting, medical devices, projectors, night vision, thermal imaging, and many more.

**What Type of Tools does an optical engineer use for design?**

With today's modern high-speed growing technologies in computer programming, an Optical Engineer has many choices in selecting the proper software as a tool for his/her optical design. There are two major optical designs: imaging and non-imaging designs. For imaging designs, ZEMAX and Code V are software tools. For non-imaging design, one can use Lighttools, FRED, and …

**How to design an optical system?**

Optical engineers often design optical systems such as lenses and reflectors with training in optical physics. Custom software programs like Zemax and CodeV are used to calculate the path of photons as they move through and around a system and to design methods to control the direction of those light rays.

**How to design a lens in Solidworks?**

Solidworks is not useful for the design of lenses or optics. To design lens systems, ray tracing is necessary; optical engineers use programs like Zemax to create the shapes of lenses, reflectors, and light pipes to control photons.

**How to design a Macro Lens?**

The custom design of a macro lens requires using ray tracing software such as Zemax. One can use this program to design lens elements (or multiple elements) to the application's requirements, including the field of view, resolution, and wavelength range.

**What is a freeform lens design?**

In optics design, including lenses and reflectors, a freeform design is a surface with multiple points of control. A bezier curve is an example of a freeform design: it allows the development of more complex shapes and results in optics with higher performance results.

**How to measure lens resolution?**

Lens resolution tells us the quality of an image created by the lens; there are many methods, but using a special target is the most straightforward tool. One can determine resolutions when the system is focused by placing a target at different locations in front of the optical system's field of view. For example, using the line pairs as a target for the smallest set, you can assess the quality of the lens.

**What are LED optics?**

[LED optics](https://www.opticsforhire.com/blog/advanced-materials-for-led-optics) can be lenses, TIR lenses, reflectors, or light pipes and are used to control and distribute the light rays from an LED to provide a specified light pattern.

**What is a TIR lens?**

A TIR lens uses "Total Internal Reflection" to direct light rays to a target area. They are commonly used for LED illumination. These lenses take advantage of the same physical principle that can make a flat water body appear as a mirror. Light will be redirected rather than pass through a surface based on the surface angles and different materials' refractive indices.

More Question? Please email us: info@fundamentalopticalsolutions.com