



# **TRINITY COLLEGE FOR WOMEN NAMAKKAL**

**Department of Physics**

**ELETRONICS IN DAILY LIFE-**

**23PPHS01-EVEN Semester**

**Presented by**

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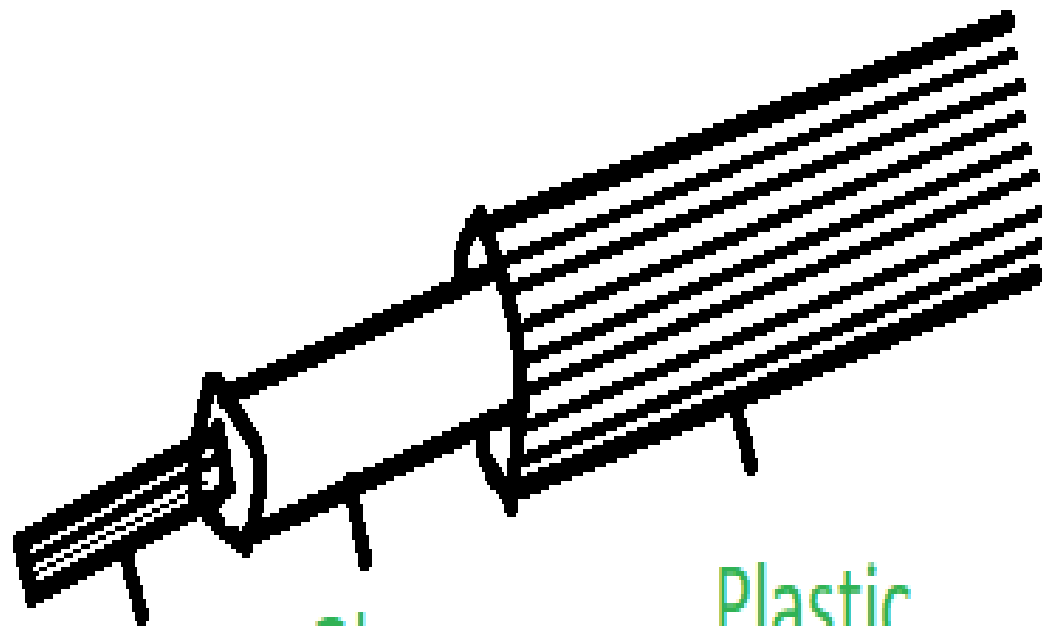
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# FIBER OPTICS

An Optical Fiber is a cylindrical fiber of glass which is hair thin size or any transparent dielectric medium. The fiber which is used for optical communication is waveguides made of transparent dielectrics.



Glass  
core

Glass  
Cladding

Plastic  
Packet

# Main element of Fiber Optics

**Core:** It is the central tube of very thin size made of optically transparent dielectric medium and carries the light transmitter to receiver and the core diameter may vary from about 5 $\mu$ m to 100  $\mu$ m.

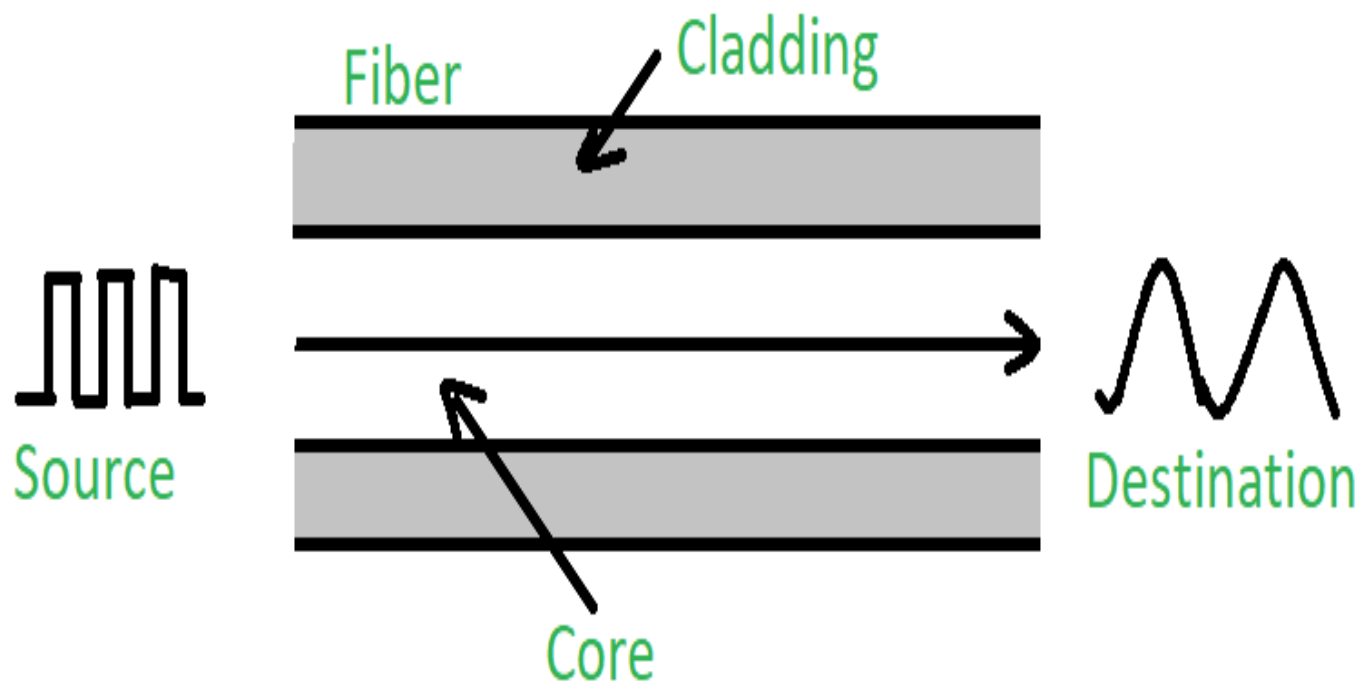
**Cladding:** It is outer optical material surrounding the core having reflecting index lower than core and cladding helps to keep the light within the core throughout the phenomena of total internal reflection.

**Buffer Coating:** It is a plastic coating that protects the fiber made of silicon rubber. The typical diameter of the fiber after the coating is 250-300  $\mu$ m.

# Types of Fiber optics

## On the basis of the Number of Modes:

**Single-mode fiber:** In single mode fiber, only one type of ray of light can propagate through the fiber. This type of fiber has a small core diameter (5 $\mu$ m) and high cladding diameter (70 $\mu$ m) and the difference between the refractive of core and cladding is very small. There is no dispersion i.e. no degradation of the signal during traveling through the fiber. The light is passed through it through a laser diode.

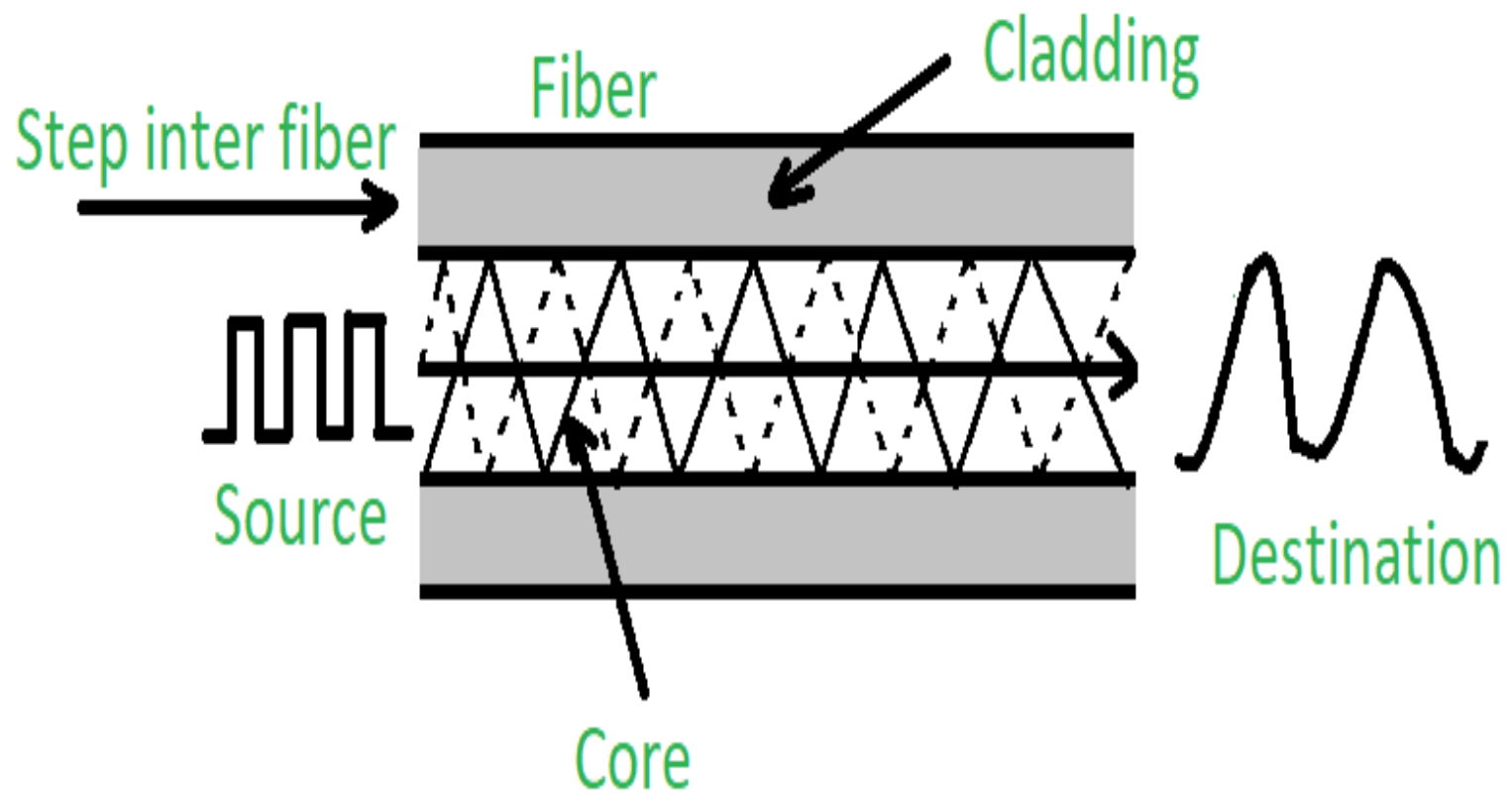


**Multi-mode fiber:** Multi mode allows a large number of modes for the light ray traveling through it. The core diameter is generally (40um) and that of cladding is (70um). The relative refractive index difference is also greater than single mode fiber. There is signal degradation due to multimode dispersion. It is not suitable for long-distance communication due to large dispersion and attenuation of the signal. There are two categories on the basis of Multi-mode fiber i.e. **Step Index Fiber** and **Graded Index Fiber**. Basically these are categories under the types of optical fiber on the basis of Refractive Index

## On the basis of Refractive Index:

**Step-index optical fiber:** The refractive index of core is constant. The refractive index of the cladding is also constant. The rays of light propagate through it in the form of meridional rays which cross the fiber axis during every reflection at the core-cladding boundary.





# THANK YOU

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