



TRINITY COLLEGE FOR WOMEN NAMAKKAL

Department of Physics

OPTO ELECTRONIC DEVICE

19PPHE02-ODD Semester

Presented by

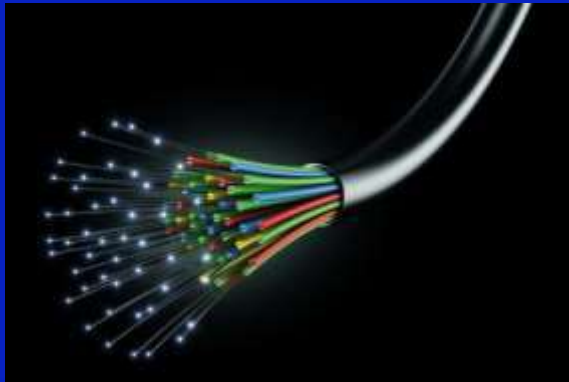
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PRESENTATION ON FIBER OPTIC MATERIAL

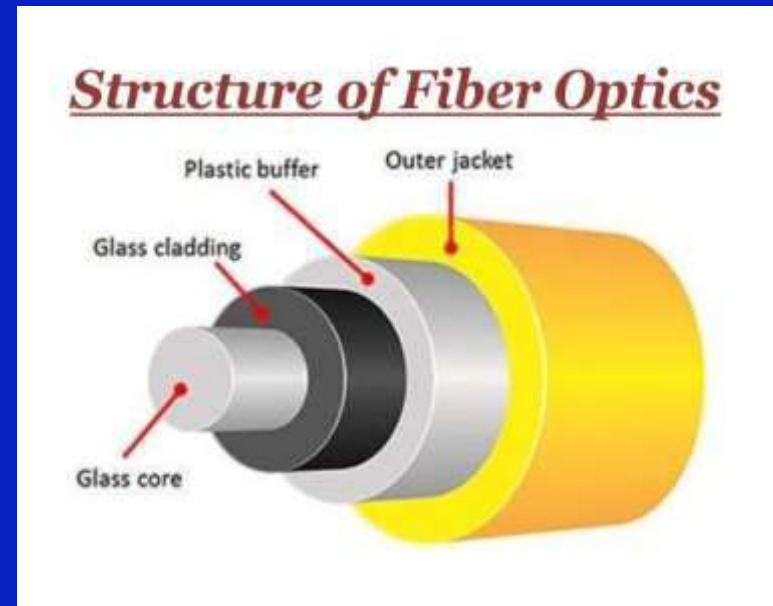
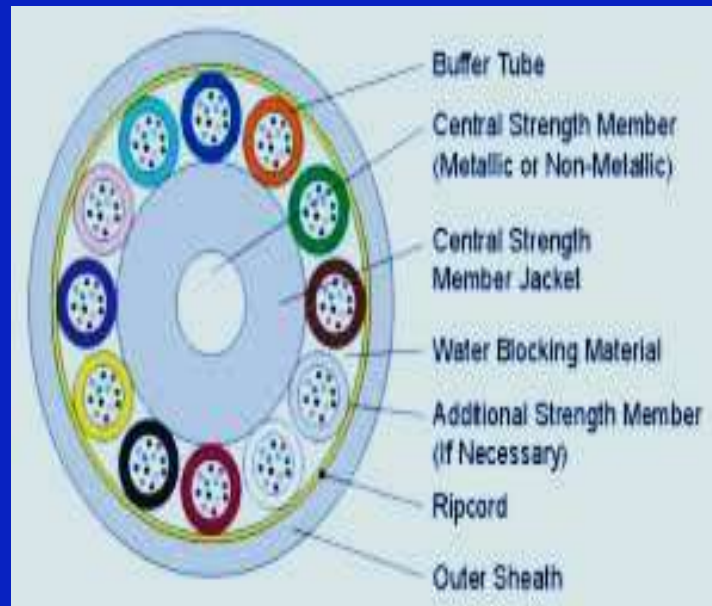


What is Optic Fiber ?

- ❖ An optical fiber is a hair thin cylindrical fiber of glass or any transparent dielectric medium.
- ❖ The fiber which are used for optical communication are wave guides made of transparent dielectrics.
- ❖ Its function is to guide visible and infrared light over long distance.

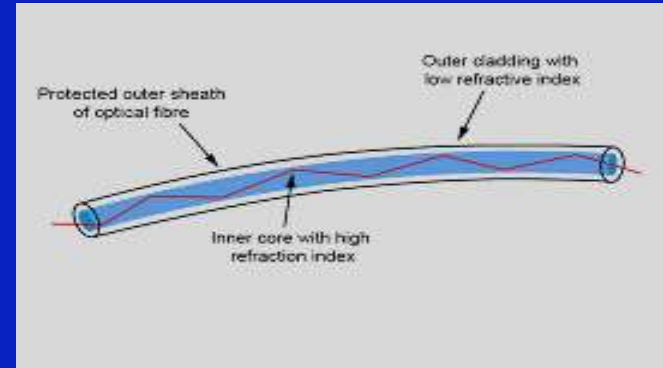
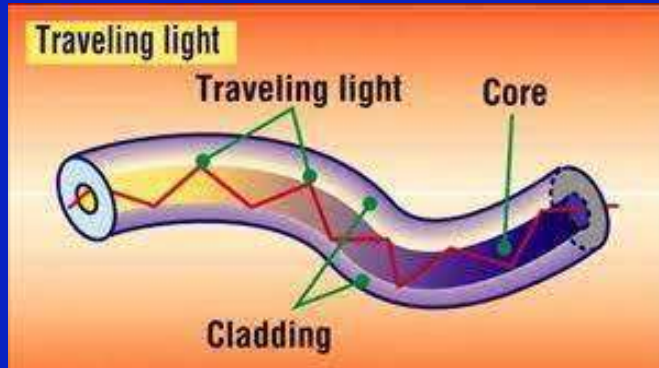


Structure of Fiber Optic



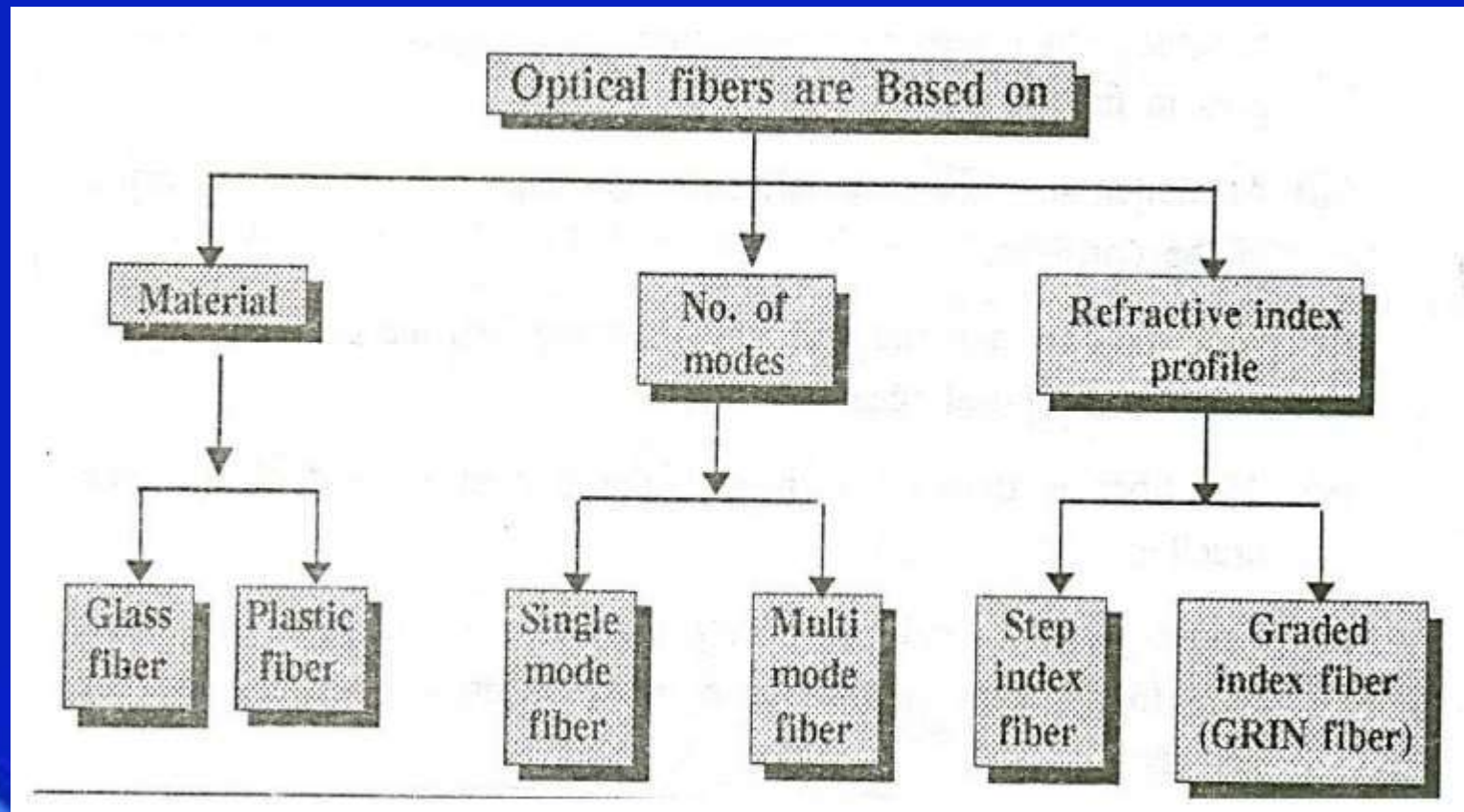
Working Principle

- Total Reflection (TIR)

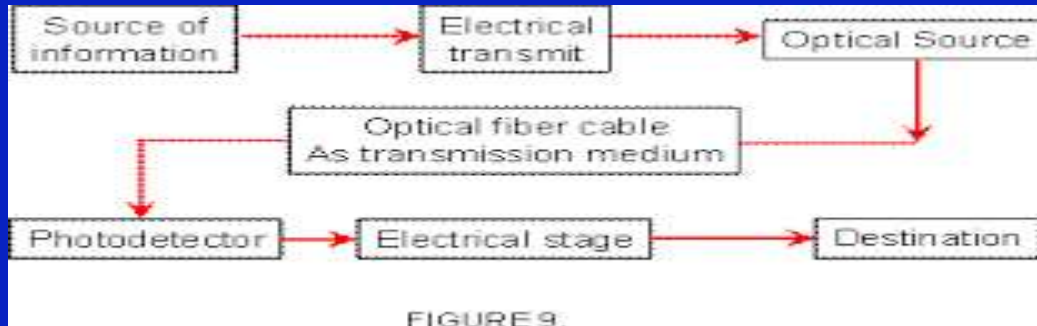


- When an ray of light travels from a denser to a rarer medium such that the angle of incidence is greater than the critical angle, the ray reflects back into the same medium this phenomena is called TIR.

Classification of Optical fiber



Fiber Optic Communication System



- **Information source**- it provide an electrical signal to transmitter comprising an electrical stage.
- **Electrical transmitter**- It drives an optical source to give an modulation of the light wave carrier.
- **Optical source**- It provided the electrical – optical conversion. It may be a semiconductor laser or an LED.

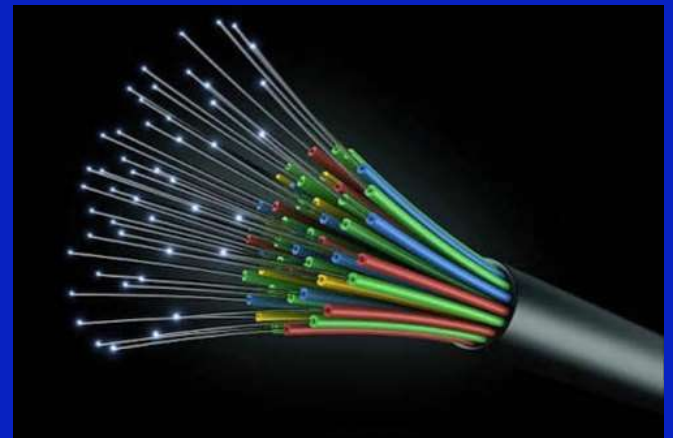
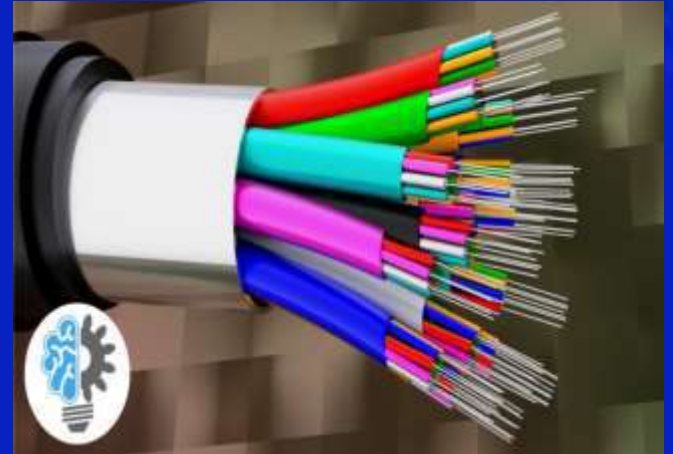
Application

Optical fiber have wider range if application in almost all field, some are specified below:

- In telecommunication field.
- Civil, consumer and industries application.
- In military application.
- Broadband application.
- Industrial and Commercial purpose.
- Networking.
- Data storage.

Fiber Optic Cable

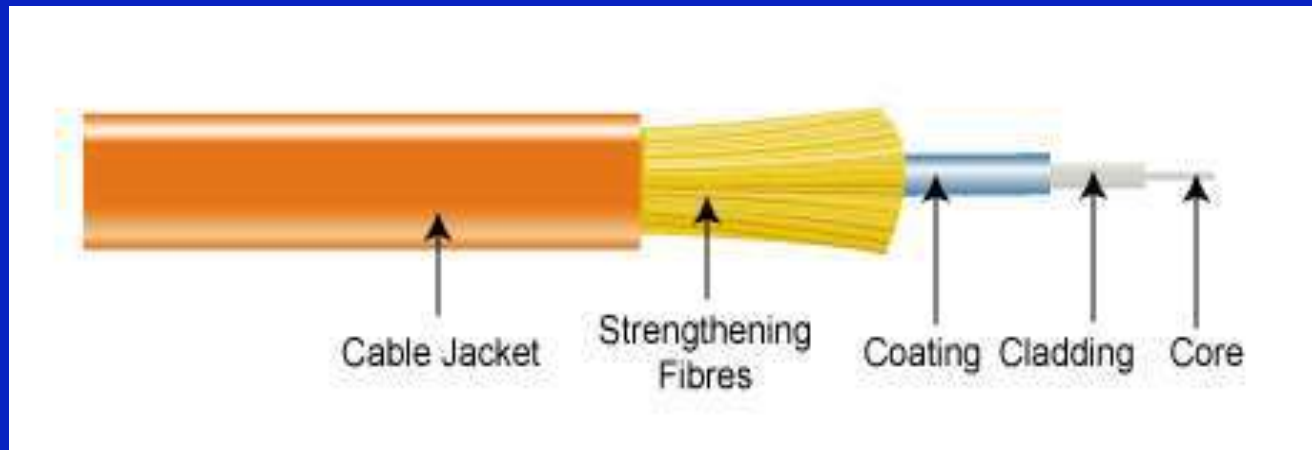
- Protect the fibres wherever they are installed
- May have 1 to over 1000 fibres



Fiber Cable Construction

A fiber optic cable consists of five main components: **core, cladding, coating, strengthening fibers, and cable jacket.**

Core: This is the physical medium that transports optical signals from an attached light source to a receiving device.

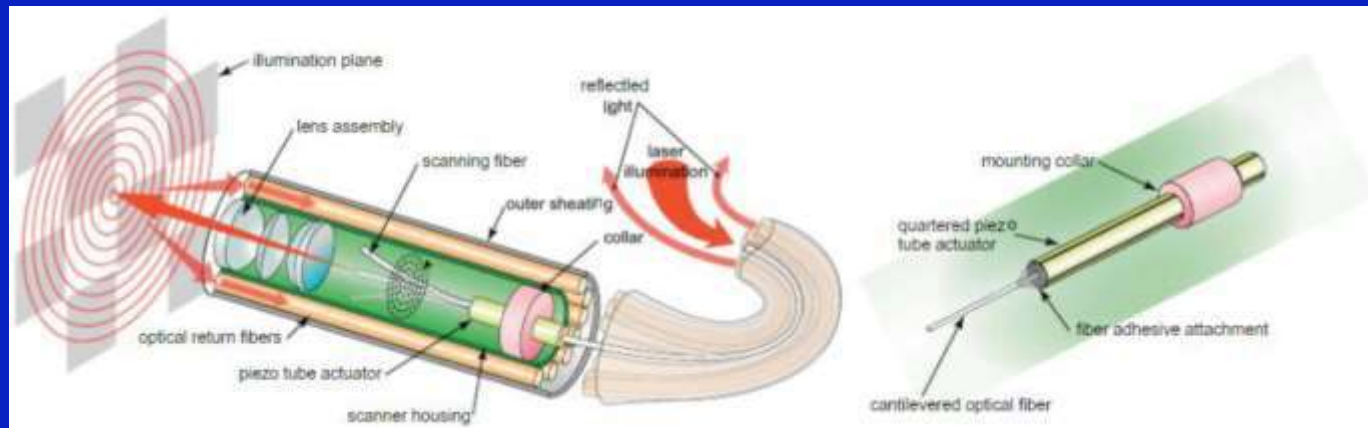


Advantage of Fiber Optic

- Compared to copper cables, fibre optic cables are thinner and lighter in weight. Fibre can withstand more pull pressure than copper and is less prone to damage and breakage.
- Fibre is flexible, can bend easily and resists most corrosive elements that often attack copper cables.
- Fibre optic cables have much greater bandwidth than metal cables. Information can be transmitted per unit time of fibre over other transmission media, giving fibre optic cables a significant advantage.

The Endoscope (in medical field)

There are two optical fibres in endoscope:



- 1) One for light, to illuminate the inside of patient.
- 2) Another for a camera to send the images back to doctor.

Conclusion

Optical fiber technology has been used in many areas of telecommunication, photonics, medical and engineering. It has attracted many researchers due to its performance, **low loss**, no interference, higher bandwidth and its inherently high data-carrying capacity.