



# SNS College of Engineering

An Autonomous Institution

Accredited by NAAC-UGC with 'A' Grade,  
Approved by AICTE, Recognized by UGC and Affiliated to Anna University, Chennai

Redesigning Common Mind & Business Towards Excellence



Build an Entrepreneurial Mindset Through Our Design Thinking FrameWork

## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

**COURSE NAME : 19EC602 – Microwave and Optical Engineering**

**III YEAR / VI SEMESTER**

### **Unit IV – OPTICAL COMMUNICATION**

**Topic : Acceptance Angle and Numerical aperture**

**Acceptance angle and Numerical aperture/ 19EC602/ Microwave and Optical  
Engineering/Mrs.D.Vishnu Priya /ECE/SNSCE**



# INTRODUCTION

## Acceptance angle:

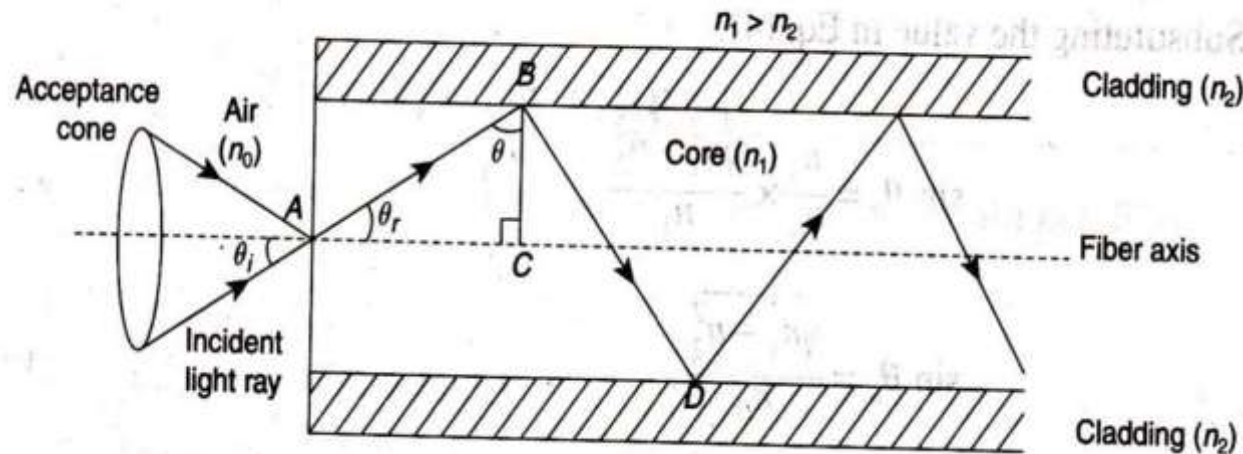
- Half of the angular aperture of an optical system
- Acceptance angle (optical fiber), the angle in an optical fiber below which rays are guided rays
- Acceptance angle (solar concentrator)

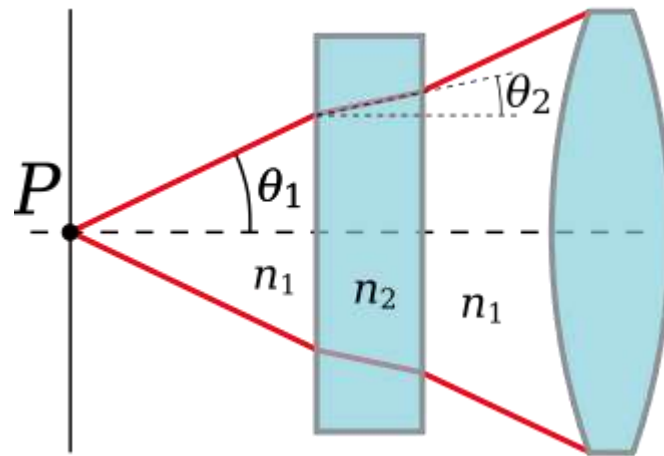
## Numerical aperture:

The **numerical aperture (NA)** of an optical system is a [dimensionless number](#) that characterizes the range of angles over which the system can accept or emit light. By incorporating [index of refraction](#) .

## Acceptance angle and acceptance cone:

- The maximum angle at which the light can suffer total internal reflection is called as acceptance angle.
- The acceptance cone is derived by rotating the Acceptance Angle about the fiber axis.





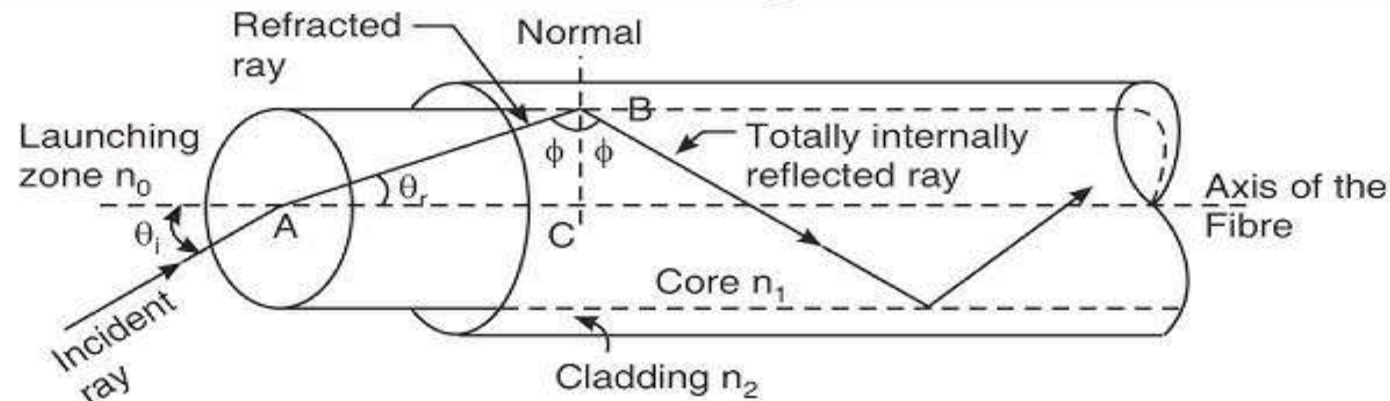
**Numerical aperture**

$$NA = n \sin \theta,$$

where  $n$  is the [index of refraction](#) of the medium in which the lens is working (1.00 for [air](#), 1.33 for pure [water](#), and typically 1.52 for [immersion oil](#);<sup>[1]</sup> see also [list of refractive indices](#)), and  $\theta$  is the [half-angle](#) of the maximum cone of light that can enter or exit the lens.

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## Acceptance angle & Numerical aperture



Geometry for the calculation of acceptance angle of the fibre.

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# APPLICATIONS

- Optical fibre is a hair-like flexible and transparent fibre which is used for the transmission of data signals over large distances with a higher speed.
- Hence optical fibre is used to provide the service of internet, telephone and television etc.
- Optical fibre works on the principle of total internal reflection.

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Any Query????

Thank you.....

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