

# Geometric Optics

**Spoken Tutorial Project**

**<https://spoken-tutorial.org>**

**National Mission on Education through ICT**

**Spoken Tutorial & FOSSEE Team  
IIT Bombay**

**22 October 2024**



# Learning Objectives



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**We will learn about,**



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**We will learn about,**

- **Image formed by a lens and a mirror**



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**We will learn about,**

- ▶ **Image formed by a lens and a mirror**
- ▶ **Distance between the lens or mirror and the image**



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**We will learn about,**

- ▶ **Image formed by a lens and a mirror**
- ▶ **Distance between the lens or mirror and the image**
- ▶ **Size and nature of the image formed**



# System Requirement



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► **Ubuntu Linux OS v22.04**





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- ▶ **Ubuntu Linux OS v22.04**
- ▶ **Firefox web browser v126.0.1**



# Prerequisites



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- ▶ **Learner should be familiar with topics in basic physics**



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- ▶ Learner should be familiar with topics in basic physics
- ▶ Please use the link below to access the tutorials on PhET Simulations  
<https://spoken-tutorial.org>



# Link for PhET Simulation

- ▶ Please use the given link to download the PhET simulation  
<https://phet.colorado.edu/en/simulations/geometric-optics>



# Geometric Optics



# Geometric Optics

- **Geometric optics is a branch of optics**



# Geometric Optics

- ▶ **Geometric optics is a branch of optics**
- ▶ **It shows propagation of light in the form of rays, which pass through a medium**





# PhET Simulations



# PhET Simulations

**In this tutorial we will use,**



# PhET Simulations

## In this tutorial we will use,

## ► Geometric Optics PhET Simulation



# Image Formation by a Convex lens

Table 1: Image formation by a convex lens

Object Position	Image Position	Image Size	Nature
At $2F_1$	At $2F_2$	Same size as object	Real, inverted
Beyond $2F_1$	Between $F_2$ and $2F_2$	Diminished	Real, inverted
Between $F_1$ and $2F_1$	Beyond $2F_2$	Magnified	Real, inverted
At $F_1$	Infinity	Highly magnified	Real, inverted
Between $F_1$ and O	On the same side as object	Magnified	Virtual, erect
Infinity	$F_2$	Point Sized	Real, inverted

Concave lens forms a virtual and erect image on the same side of the lens between  $F_1$  and O. It is always diminished.



# Image Formation by a Concave mirror

Table 2 : Image formation by a concave mirror

Object Position	Image Position	Image Size	Nature
At $2F_1$	At $2F_2$	Same size as object	Real, inverted
Between $F_1$ and O	Behind the mirror	Magnified	Virtual, erect
Beyond $2F_1$	Between $F_2$ and $2F_2$	Diminished	Real, inverted
Between $F_1$ and $2F_1$	Beyond $2F_2$	Magnified	Real, inverted
At $F_1$	Infinity	Highly magnified	Real, inverted
Infinity	At the focus $F_2$	Point Sized	Real, inverted



# Summary

**We have learnt about,**

- ▶ **Image formed by a lens and a mirror**
- ▶ **Distance between the lens or mirror and the image**
- ▶ **Size and nature of the image**



# Assignment

- Explore the Flat mirror option on your own



# About the Spoken Tutorial Project

- ▶ Watch the video available at [https://spoken-tutorial.org/What\\_is\\_a\\_Spoken\\_Tutorial](https://spoken-tutorial.org/What_is_a_Spoken_Tutorial)
- ▶ It summarises the Spoken Tutorial project





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- ▶ It summarises the Spoken Tutorial project
- ▶ If you do not have good bandwidth, you can download and watch it



# Spoken Tutorial Workshops

## The Spoken Tutorial Project Team

- ▶ Conducts workshops using spoken tutorials
- ▶ Gives certificates to those who pass an online test
- ▶ For more details, please write to [contact@spoken-tutorial.org](mailto:contact@spoken-tutorial.org)



# Answers for THIS Spoken Tutorial

- ▶ Questions in THIS Spoken Tutorial?
- ▶ Visit  
<https://forums.spoken-tutorial.org>
- ▶ Choose the minute and second where you have the question
- ▶ Explain your question briefly
- ▶ The Spoken Tutorial project will ensure an answer



# Acknowledgements

**The Spoken Tutorial project was established by the Ministry of Education, Govt. of India**



# Thank you

- ▶ This tutorial is contributed by FOSSEE and Spoken Tutorial Project, IIT Bombay
- ▶ Thank you for joining

