

The background features three blue, 3D-rendered spheres of varying sizes. Two smaller spheres are positioned in the upper right quadrant, while a significantly larger sphere is located in the lower right quadrant. Thin, light blue lines intersect at the top-left corner and extend diagonally across the page, creating a geometric pattern.

**Al-Mustaqbal University College  
Medical Physics Department**

**Lecture 4 / Optics – Second Stage  
Dr. Aiyah Sabah Noori  
M.SC Hala Mohammed  
2022-2023**



## Lecture Outline

### Mirror

#### Types of mirror

#### Law of reflection and refraction from spherical Mirror

#### Real Image and Virtual Image according to reflection

#### Gaussian derivative

### What Is a Mirror?

A **mirror** is a surface that is smooth enough that it produces specular reflection - clear reflections. The mirrors can be made into different shapes for different purposes. Two of those shapes are planes and spheres.

What's the difference between a plane mirror and a spherical mirror?

المرآة هي سطح أملس بما يكفي لإنتاج انعكاس للشكل . يمكن صنع المرايا بأشكال مختلفة لأغراض مختلفة. اثنان من هذه الأشكال عبارة عن شكل مستوي وشكل كروي.

Plane Mirror	Spherical Mirror
<p>1. A plane mirror has only one kind of reflecting surface which is the plane surface. المرآة المستوية لها نوع واحد فقط من السطح العاكس وهو السطح المستوي.</p>	<p>1. A spherical mirror has two types of reflecting surface: concave surface and convex surface. المرآة الكروية لها نوعان من السطح العاكس: السطح المقعر والسطح المحدب.</p>
<p>2. The radius of curvature of a plane mirror is at infinity. يكون نصف قطر انحناء مرآة مستوية في اللانهاية</p>	<p>2. The radius of curvature of the spherical mirror has a finite length. نصف قطر انحناء المرآة الكروية له طول محدد.</p>
<p>3. The image produced by a plane mirror is always virtual. الصورة التي يتم إنتاجها بواسطة مرآة مستوية تكون دائمًا افتراضية.</p>	<p>3. The image produced by a concave reflecting surface can be real as well as virtual يمكن أن تكون الصورة التي ينتجها سطح عاكس مقعر حقيقية وكذلك افتراضية</p>