



Photography

التصوير الفوتوغرافي

4th Lecture

Interior Design Department
TIU

Lecturer
Musaab Sami Al-Obeidy




1

Focal Length and Angle of view

The focal length of the lens is the distance between the lens and the image sensor when the subject is in focus, usually stated in millimeters (e.g., 28 mm, 50 mm, or 100 mm). In the case of zoom lenses, both the minimum and maximum focal lengths are stated, for example 18–55 mm.

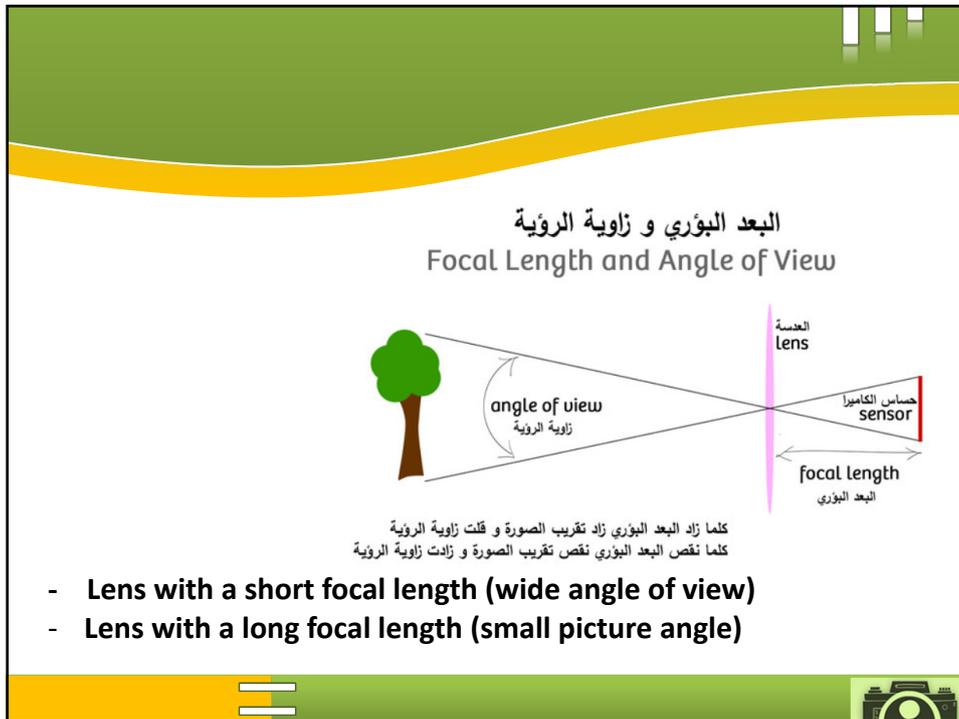
The angle of view is the visible extent of the scene captured by the image sensor, stated as an angle. Wide angle of views capture greater areas, small angles smaller areas. Changing the focal length changes the angle of view. The shorter the focal length (e.g. 18 mm), the wider the angle of view and the greater the area captured. The longer the focal length (e.g. 55 mm), the smaller the angle and the larger the subject appears to be.



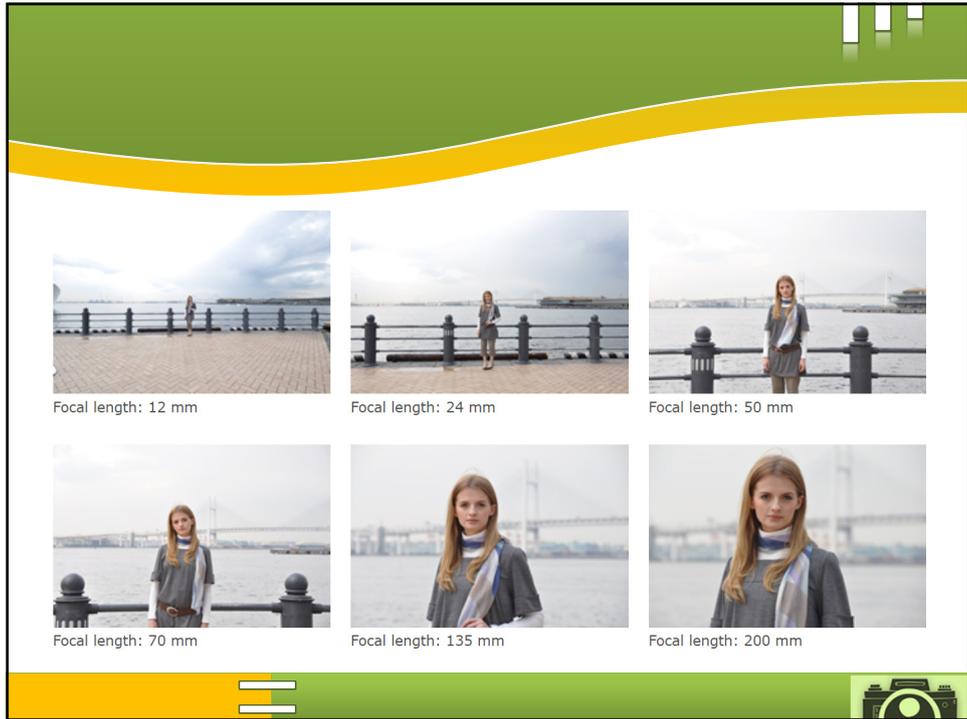
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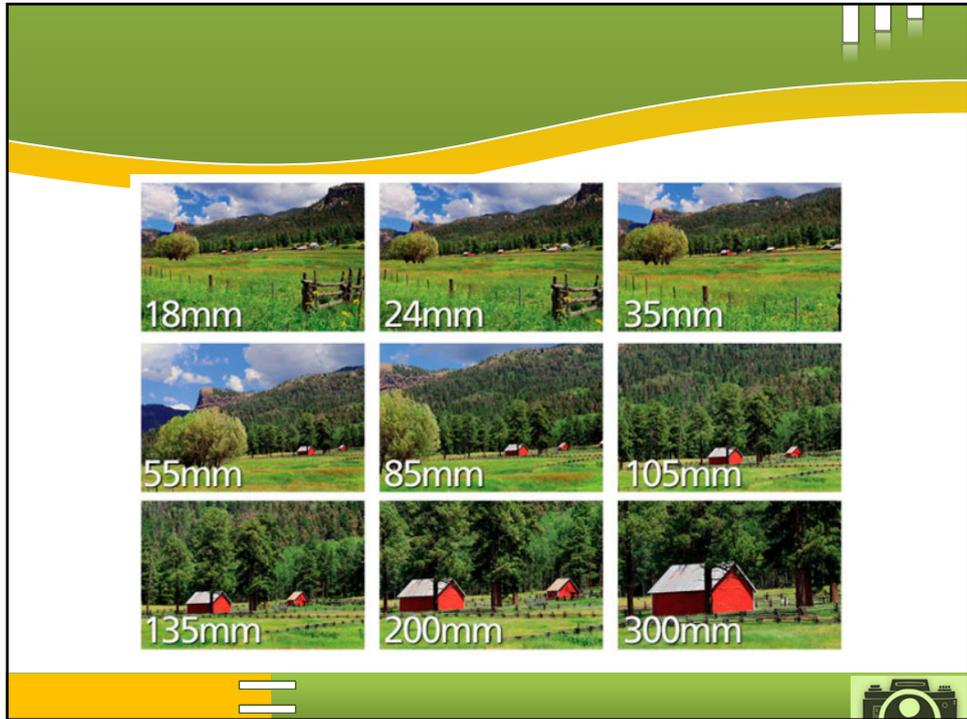
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6

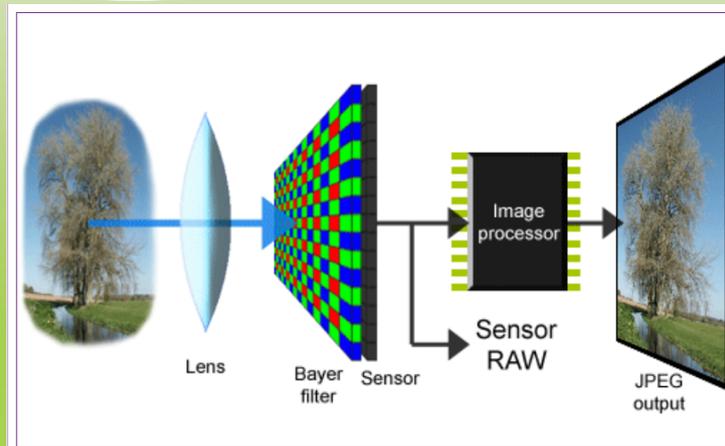
Image Sensor

An image sensor is an electronic device that converts an optical image into an electronic signal. It is used in digital cameras and imaging devices to convert the light received on the camera or imaging device lens into a digital image.

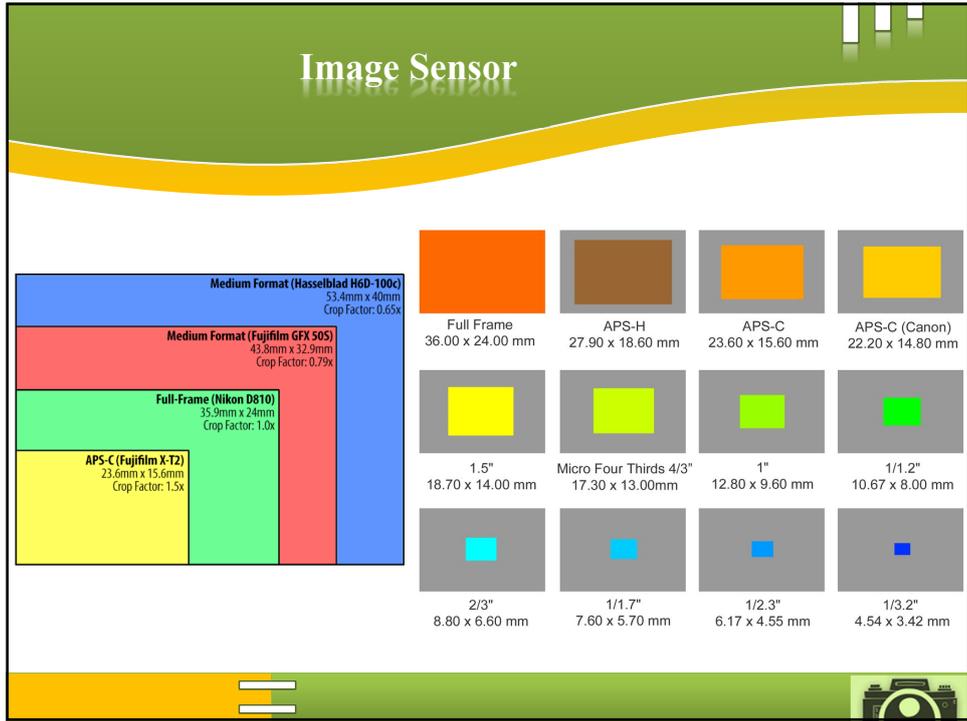


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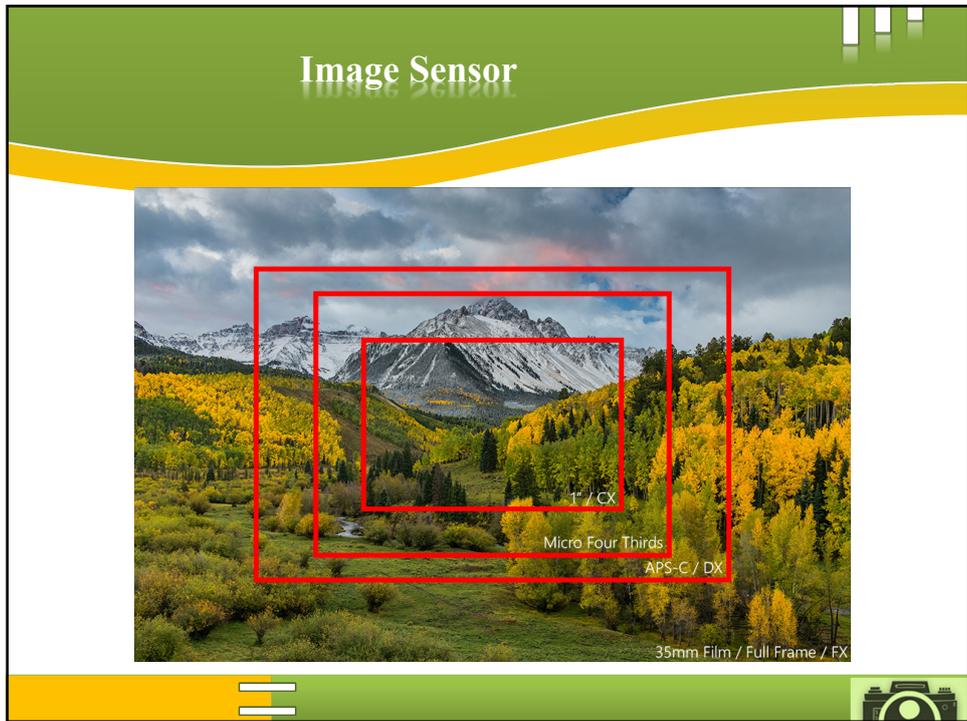
Image Sensor



8



9



10

Image Sensor

DX and FX Formats Compared

The DX and FX formats use different crops, resulting in different picture angles (and magnifications) with lenses of identical focal lengths.

Crop

DX format crop : small FX format crop : large

11

Image Sensor

DX and FX Format Cameras

FX format cameras can be identified by the "FX" label on the camera body.

<p>DX Format Cameras</p> <p>No format label on the camera body.</p>	<p>FX Format Cameras</p> <p>FX format cameras bear an "FX" label.</p>
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12

Image Sensor

DX Format Lenses



DX format lenses bear a "DX" label.

FX Format Lenses



No format label on the lens.

13



How to read lens symbols

Lenses symbols like:

- Nikkor AF Zoom-Nikkor 70-300mm f/4-5.6G**
- AF-S DX NIKKOR 55-300mm f/4.5-5.6G ED VR**
- AF-S DX Micro NIKKOR 85mm f/3.5G ED VR**
- Sigma 24-70mm f/2.8 EX DG**
- Canon EF 24-70mm f/2.8L II USM Lens**

14



How to read lens symbols

	Full Frame	Crop Sensor	Image Stabilisation	Silent Wave Motor	Pro Lens	Low Dispersion Glass
Canon	EF	EF-S	IS	USM	L	ED
Nikon	FX	DX	VR	SWM / AF-S	-	ED
Sony	No extra writing	DT	Not in Lens	SSM	G	ED
Sigma	DG	DC	OS	HSM	EX	APO
Tamron	Di	Di-II	VC	USD	SP	LD

15



How to read lens symbols

image stabilization system Canon bayonet
compatibility with camera sensors internal focusing

Tamron SP AF 17-50mm f/2.8 XR Di-II VC LD Aspherical (IF) pro Canon

focal length range special materials
lens speed special lens shape

16



How to read lens symbols

Nikon Lens Naming Convention

AF – stands for Auto Focus.

MF – stands for Manual Focus.

AF-S – Auto Focus with Silent Wave Motor.

AF-P – Auto Focus with Stepping Motor. These are the newest generation built-in motors that are fast and ultra-quiet, making them ideal for both photography and videography needs.



17



How to read lens symbols

ASP – Lens contains at least one a spherical lens element, which is used for correcting coma and other lens aberrations. Sometimes goes by “AS”.

CRC – Close Range Correction lenses that are optimized for close focusing distances.

D – D-type lenses send camera to subject distance information to the camera.

DC – Defocus Control lenses allow controlling the [bokeh](#), which is great for portraits.

ED – Extra-low Dispersion glass elements within the lens do not disperse the light as it enters the lens.

FL – Newly introduced in 2013. Indicates that the lens has Fluorite Lens elements, which are optically superior and significantly lighter glass elements.



18



How to read lens symbols

G –it means that the lens does not have an aperture ring like the old lenses.

HRI – Stands for High Refractive Index lens, designed to reduce [field curvature](#) and [spherical aberrations](#).

E – The new “E” type lenses feature electronic diaphragm control. These lenses do not have the aperture lever on the back of the lens and are fully electronic, so there is no way to manually adjust the aperture anymore. “E” type lenses are more accurate than “G” type lenses.



19



How to read lens symbols

IF – Internal Focusing allows the lens to quickly focus by moving some of the elements inside the lens barrel, without moving the front barrel or extending in size.

Micro – Lens is designated for macro lenses for close-up work.

N – The letter “N” stands for Nano Crystal Coat and it is always displayed in a golden sticker on all top of the line Nikon lenses. It is a special type of glass coating.

VR – Vibration Reduction allows using lenses hand-held without the need for a tripod in low-light situations.



20



How to read lens symbols

[Nikon - AF-S NIKKOR 28-300mm f/3.5-5.6G ED VR](#)

[Nikon - AF-S VR Micro-Nikkor 105mm f/2.8G IF-ED Macro Lens](#)

[Canon - EF 85mm f/1.8 USM Medium Telephoto Lens](#)

[Tamron - SP 24-70mm F/2.8 Di VC USD G2 Zoom Lens for Nikon DSLR cameras - black](#)



21

Types Of Lenses




22

Types Of Lenses

1.Prime Lens

A prime is a fixed-focal-length lens, such as 35mm, 50mm, 85mm and so on. Typically, faster (i.e., possessing a wider maximum aperture, smaller f-number) due to the simplified optical construction, primes are frequently smaller and lighter than zoom lenses, as well, and traditionally are high quality, by default. Professional models are larger, but also exceptionally sharp.



Prime and Portrait Lens

23

Types Of Lenses

2.Zoom Lens

A zoom lens can be adjusted across a range of focal lengths, for instance, a 24-70mm zoom lens. Some zooms are wide-angle, some are telephoto, and some “extreme zooms” cover a range from wide to telephoto. As for benefits, a single lens can cover a wide range, so a single zoom can replace two or three prime lenses. This makes it ideal for travel or street photography, where the ability to change focal lengths quickly and to travel light are distinct benefits. One downside is that fast zooms (with wider maximum apertures) are very expensive.



24-70mm Zoom Lens

24

Types Of Lenses

3. Wide-Angle Lens

A wide-angle lens is generally any lens shorter than 40mm, which provides an angle of view "wider" than a normal lens. Typical wide-angle focal lengths are 17mm, 20mm, 24mm, 28mm and 35mm. Lenses shorter than 17mm are considered "superwide" and provide a huge angle of view up to and beyond 180 degrees. The widest of these lenses are known as fisheyes.



Fisheye and Ultrawide Zoom

25

Types Of Lenses

4. Telephoto Lens

A telephoto lens has a focal length greater than 70mm. Popular telephoto focal lengths are 70-200mm zooms, and 85mm, 100mm, 135mm and 150mm primes. Especially long lenses, above 300mm, are called supertelephotos.



Super-telephoto Zoom

26

