



BASICS OF DIGITAL PHOTOGRAPHY

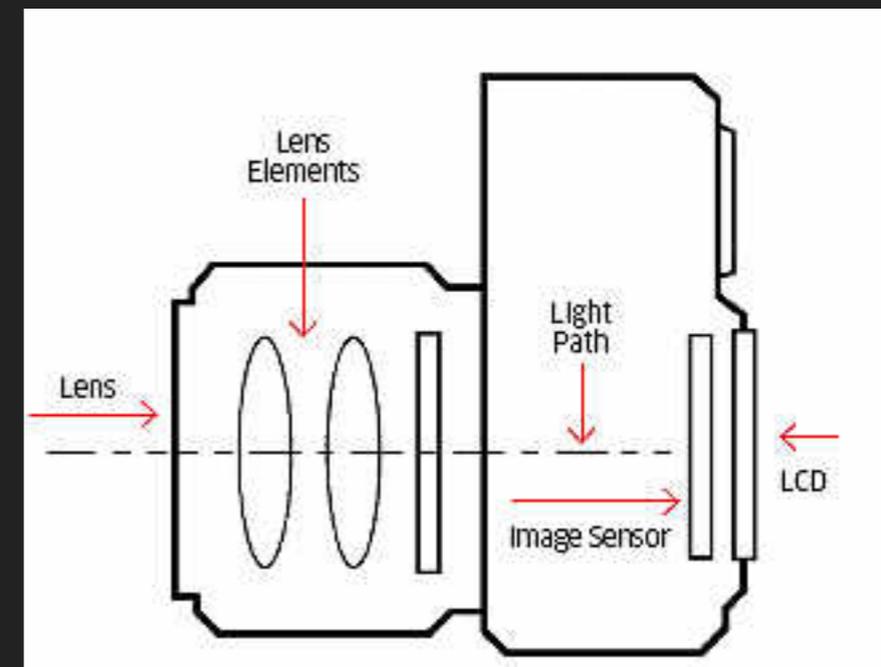
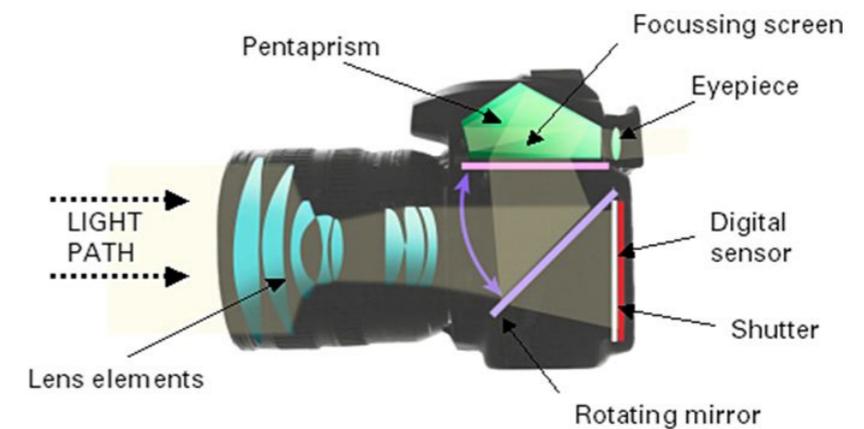
HOW DO DIGITAL CAMERAS WORK?

- ▶ DSLR: light comes through the lens and bounces off a mirror through a pentaprism into the eyepiece
 - ▶ To take a picture, mirror moves up to expose sensor
- ▶ Mirrorless: as the name suggests, no mirror in front of sensor
 - ▶ No optical viewfinder, only shows what the camera sees via live view on electronic display

Cross section of a digital SLR

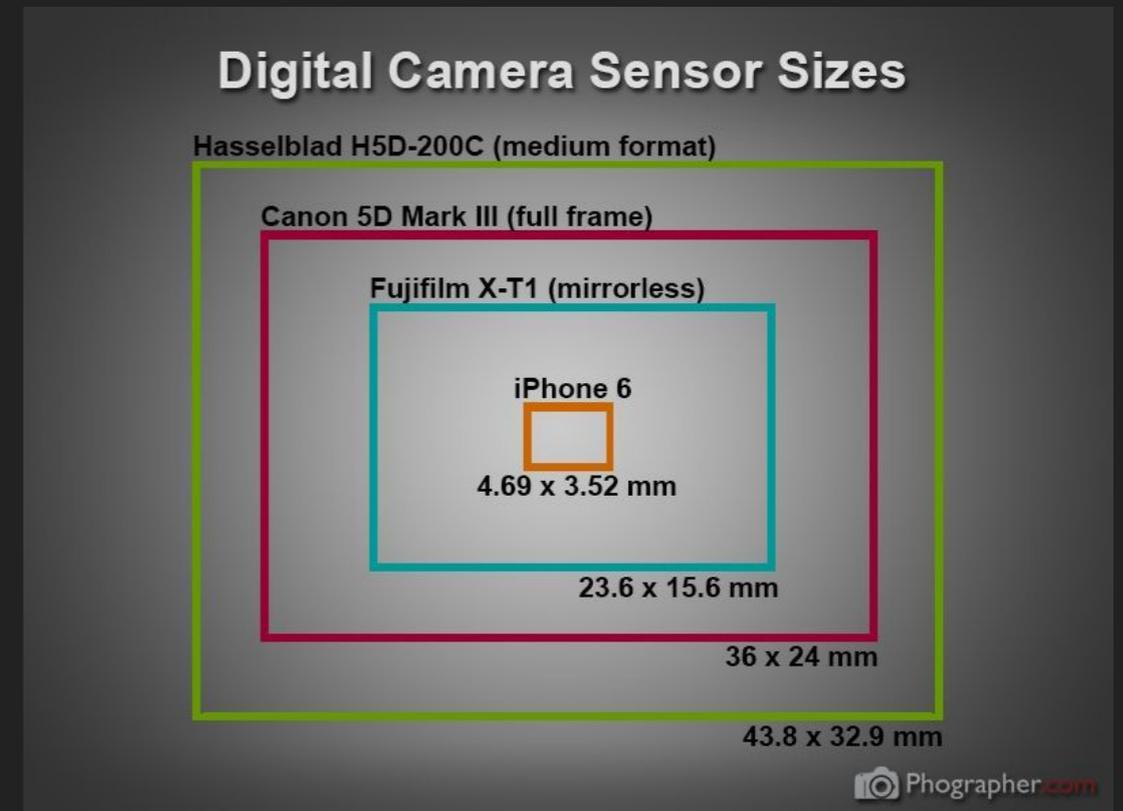


- Diagram 2. Cross section of a digital SLR



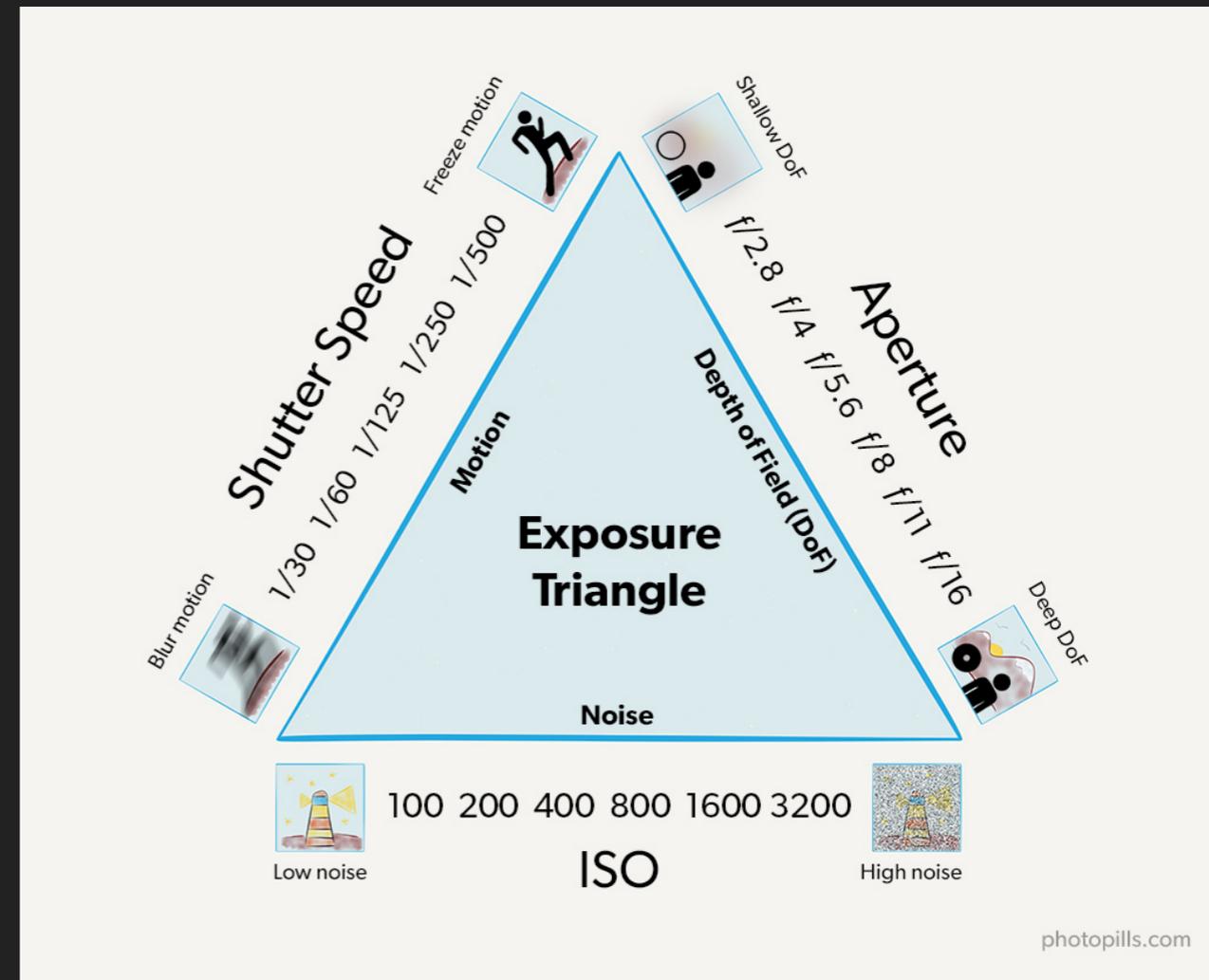
WHAT ABOUT MY PHONE?

- ▶ Functions effectively identically to a mirrorless camera
- ▶ Much smaller sensor
- ▶ Most feature only one catch-all lens
- ▶ Great for convenience and portability, bad for control and options
- ▶ Some apps allow for manual controls, but options still limited



UNDERSTANDING CAMERA CONTROLS

- ▶ It's all about the light metering triangle
 - ▶ Aperture, Shutter Speed, ISO
- ▶ By changing these 3 settings, you control your picture's exposure
- ▶ Understanding the relationship of these 3 is pivotal to taking better photos



APERTURE

- ▶ A series of overlapping metal blades within the lens that adjust to let in more or less light
- ▶ Represented by f/ number, where smaller numbers mean a larger aperture
- ▶ Constant vs variable aperture lenses
 - ▶ Most kit zoom lenses are variable aperture, much cheaper
- ▶ Larger aperture results in shallower depth of field (how much of the picture is in focus)

LARGE APERTURE VS SMALL APERTURE

Large Aperture (F4.0)
Background nicely blurred



Small Aperture (F22)
Background is distracting



SHUTTER SPEED

- ▶ How long the sensor is exposed to light
 - ▶ Ranges generally between $1/4$ s and $1/4000$ s
- ▶ Slower shutter speeds can introduce motion blur
 - ▶ Good rule of thumb to avoid motion blur, shoot with a speed no slower than $1/\text{focal length}$ of your lens
 - ▶ To stop action, shutter speeds of $\sim 1/200$ or faster are needed
- ▶ Large apertures allow for faster shutter speeds, and conversely slower shutter speeds allow for smaller apertures

TEXT

FAST SHUTTER SPEED VS SLOW SHUTTER SPEED



Image Credit: Bryan Maltais

ISO

- ▶ Determines how sensitive to light the camera's sensor is
 - ▶ Values range typically between 100-6400, nowadays some cameras can go up to 12800 and beyond
- ▶ Lower ISO means less sensitive to light, resulting in longer shutter speeds and larger necessary apertures
 - ▶ also results in higher image quality and detail
- ▶ High ISO introduces grain/noise, makes images appear fuzzy

TEXT

HIGH ISO VS LOW ISO

Comparing the extremes of ISO



ISO 100 (my camera's base ISO)



ISO 25,600 (my camera's highest ISO)

Image Credit: Photographylife.com

WHY DOES ANY OF THIS MATTER?

- ▶ You can control all three of these settings yourself
- ▶ Strategic manipulation of these three settings based on what you're shooting results in better overall pictures
 - ▶ Landscape vs Sports
 - ▶ Studio portraiture vs environmental portraiture
- ▶ Auto on cameras works ok for everything, but isn't great for anything

USING YOUR CAMERA TO ITS FULLEST

- ▶ Camera Modes

- ▶ Canon

- ▶ Av, Tv, P, M, Auto

- ▶ Nikon

- ▶ A, S, P, M, Auto

- ▶ Sony

- ▶ A, S, P, M, Auto

PROGRAM MODE (P)

- ▶ Closer to Auto than the other modes
- ▶ Main thing you control is the ISO (other modes allow this as well)
- ▶ Camera still sets aperture and shutter speed, but you can change the settings together, i.e. the exposure will be locked but you can shoot with different pairs of aperture/shutter speed

APERTURE PRIORITY MODE (AV, A)

- ▶ You set the aperture, the camera sets the shutter speed
- ▶ Your main control wheel will adjust aperture
- ▶ Useful for portraiture, landscape, anything that doesn't need to stop motion
 - ▶ Many photographers shoot primarily in this mode
- ▶ Can still change shutter speed via exposure compensation
 - ▶ Very useful with backlit subjects where metering is inaccurate

SHUTTER PRIORITY MODE (TV, S)

- ▶ You set the shutter speed, your camera sets the aperture
- ▶ Your camera's main dial controls the shutter speed
- ▶ Primarily used for sports or high action photography
 - ▶ Also used for running water to either freeze it or let it blur
- ▶ Can still change aperture using exposure compensation

MANUAL MODE (M)

- ▶ The most control, you control every setting
- ▶ Because you control both shutter speed and aperture, you can end up with very overexposed/underexposed images
 - ▶ Important to pay attention to the light meter at the bottom of your viewfinder
- ▶ Takes the most thought and time, is not usually ideal for fast paced shooting with varying lighting conditions
- ▶ Useful for when you do not want to use the camera's light meter

LOCATIONS OF CONTROLS

- ▶ Main dial on the back will control your main setting depending on mode (aperture, shutter speed)
- ▶ If second dial is present (usually on top of camera or in grip), it will typically adjust the alternate setting (aperture, shutter speed), or exposure compensation
- ▶ Depending on camera model, access to certain settings may be found only by going through menus in certain modes

WHITE BALANCE

- ▶ Most cameras have an auto white balance function, but it never works perfectly
- ▶ standard set of preset choices: tungsten, cloudy, daylight, fluorescent, custom
 - ▶ matching your white balance to the dominant light in your scene will give you best color rendition
- ▶ Can be changed in post, but best done in camera unless you are shooting raw (which leads to...)

SHOOTING RAW VS JPG

- ▶ All digital cameras (and most smartphones) can record the photos you take as either raw, uncompressed files, or compressed jpeg files
- ▶ Each manufacturer has a different raw file type (NEF, ARW, CR2, etc.) and most can only be opened by editing software (Aperture, Adobe Photoshop or Lightroom)
- ▶ The main benefit of shooting raw is the ability to edit everything after the fact and maintain image quality
 - ▶ jpeg files can only be manipulated so much before there is a noticeable drop in quality
- ▶ Once edited, raw photos can be exported to jpeg for more conventional use
 - ▶ I still recommend printing from raw files to maintain print quality

OVERVIEW

- ▶ Understand your camera's settings and choose a mode that fits your needs
- ▶ For creative control, do not let the camera dictate what it will do
- ▶ Selecting your own white balance and shooting in a raw format will drastically increase your latitude with regards to editing
- ▶ Overall, do what works for you and feels right; you do not need to be incredibly technical to take great pictures
- ▶ Practice!