Exposure: Aperture, Shutter Speed, ISO

0:16 You can adjust the **Exposure Value (EV)** (how bright the image is) by adjusting the:
- **Aperture**
- **Shutter Speed**
- **Film Speed (ISO or ASA)**

0:43 **Shutter Speed**: the length of time a camera’s shutter is open.

5:20 **Aperture**: a hole or an opening through which light travels.

6:22 **Depth of Field (DoF)**: the distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image.

7:39 All situations are different, but outdoor portraits are typically taken with a shallow depth of field. (~F1.2 - ~F4)

8:29 **Film speed** is the measure of a photographic film’s sensitivity to light, and is measured on various numerical scales, the most recent being the **ISO** system.

9:23 **Noise**: random variation of brightness or color information in images; an undesirable by-product of high ISO.

High ISO (ex. ISO800) = Brighter + More Noise
Low ISO (ex. ISO200) = Darker + Less Noise

If you have a lower-end camera model, you may have to go into the menu to change ISO.
[102] Camera Modes and Exposure Compensation

0:21 **AUTO Mode:** Camera automatically sets the aperture, shutter speed, ISO, and pop-up flash. The Exposure Compensation button (+/-) cannot be used in this mode.

0:30 **Program Mode (P):** The camera calculates both shutter speed and aperture for you. ISO is manually dialed in, unless set to ISO-AUTO. The Exposure Compensation button works and adjusts both aperture and shutter speed together. The pop-up flash is off by default, but can be turned on manually.

0:50 **Shutter Priority (S) or Time Value (Tv):** User manually controls the shutter speed, while the camera automatically calculates the aperture for proper exposure (usually 0 EV). ISO is manually dialed in unless set to ISO-AUTO. Exposure Compensation button works and will adjust the aperture and the ISO, if ISO is set to ISO-AUTO. Pop-up flash is off by default.

1:13 **Aperture Priority (A) or Aperture Value (Av):**
User manually controls the aperture, while the camera automatically calculates the shutter speed for proper exposure (usually 0 EV). ISO is manually dialed in unless set to ISO-AUTO. Exposure Compensation button works and will adjust the shutter speed and ISO, if ISO is set to ISO-AUTO. Pop-up flash is off by default.

1:38 **Manual Mode (M):** User manually dials in both the aperture and the shutter speed. ISO is dialed in manually unless set to ISO-AUTO. Exposure Compensation can be used for metering purposes but doesn’t actually change the shutter speed or aperture. Pop-up flash is off by default.

1:47 The ISO can be dialed in manually or set to ISO-AUTO when using any of the four main modes (P, S, A, and M). ISO-AUTO is a preference that can be turned ON in the shooting menu system. I don't use ISO-AUTO.

2:46 Macro or close-up modes tend to direct the camera’s focus to be nearer the camera. It may shrink the aperture and restrict the camera to wide-angle in an attempt to broaden the depth-of-field (to include closer objects).

7:53 The Exposure Compensation button will automatically adjust the ISO as well, but only if you have set your ISO to “ISO-AUTO” in the menu system.

10:37 Manual Mode is useful when using external studio strobes or when you have enough time to adjust all the settings individually, using the EV bar as your reference for a proper exposure.
Aperture Mode is useful when you are photographing in-the-moment events, or outdoor portraits.

11:33 A general rule of thumb to avoid non-intentional camera shake is to have the shutter speed be no longer than the focal length number of your lens. For example: If using a 200mm lens, don't go longer than ~1/200th sec. If using a 50mm lens, don’t go longer than ~1/50th sec. etc.

[103] Metering Modes

0:26 Depending on your camera, you may have to go into the menu to change the metering mode. Higher-end cameras should have a dedicated knob.

0:45 **Spot Metering:** The camera will only measure a very small area of the scene, usually the spot is where the autofocus point is, if using auto-focus.

1:12 **Center-Weighted Metering:** The meter concentrates a large percentage of sensitivity towards the center of the viewfinder, feathered out near the edges.

2:36 **Multi-zone Metering:** the camera measures the light intensity in several points in the scene, and then combines the results to find the settings for the best exposure. The camera takes a number of factors into consideration, including autofocus point, distance to subject, areas in focus or out of focus, colours/hues, and backlighting. multi-zone metering may also be called:
matrix
evaluative
honeycomb
segment
electro selective pattern (esp)

[104] White Balance

7:40 If you shoot in RAW, you can make more extreme exposure and color adjustments in post-production without having the image degrade as quickly. Shooting in RAW is like having the original “digital negative” of the image. The only disadvantage of shooting in RAW is that the file-size is larger, and you must re-save/export it as JPEG file on the computer if you want to share it on the web, with a friend, etc.
Focus

Manual Focus is useful for:
- Reflections
- Macro/close-ups
- Multiple-shot Panoramas
- Low Contrast Situations
- Low Light Situations
- Lens Flare Situations
- Precise Focusing Situations
- Focusing near the edge of the frame
- Pre-Focusing action shots, timed portraits, video work, etc.
when on tripod

AF-S / Single-servo AF / ONE SHOT AF:
For stationary subjects. Focuses when shutter button is pressed halfway, then locks focus position. Useful for recomposing.

AF-C / Continuous-servo AF / AI Servo AF:
For subjects in motion. When shutter button is pushed halfway, camera focuses continuously to track subject in AF point.

AF Areas: Camera can use only one AF point, or many AF points at once (an AF Area). Different cameras have different styles of AF Areas/clusters.

Auto-area AF: Camera automatically detects subject to focus on. Faces, close subjects, and high contrast areas have most priority, if detected.

Single-point AF: Most precise AF area. Mostly used for stationary subjects.

Dynamic-area AF / AF point expansion: Uses main AF point, but also uses surrounding AF points if subject briefly moves out of the main AF Point.

9-point dynamic area AF: Useful for predictable subjects, like skateboarders, runners, race cars.
21-point dynamic area AF: Useful for unpredictable subjects, like football players.

51-point dynamic area AF: Useful for unpredictable subjects that can’t be easily framed (ie. birds).

3D Tracking: Continuously tracks subjects forever, even after completely leaving the original AF point. Useful for erratic subjects (tennis players).

Tip 1: Use the Directional Pad or back dial to select AF Point while looking through the viewfinder.

11:28

Tip 2: Place the AF point on the most visible eye (no hair covering it, etc.) that is closest to the camera.

11:43

Tip 3: Place AF Point 1/3rd to the horizon or vanishing point

13:02

Tip 4: Placing the AF point on high-contrast details will make it easy for the camera to focus on that subject.
Placing the AF point on subjects with very little contrast (ex. blank paper; a hill many meters from the camera at night) will be difficult for the camera to detect focus.

13:51

Tip 5: The center AF point is usually the strongest, fastest, and most accurate AF point.

15:07

Tip 6: Look at the autofocus options in the menu system and instruction manual. You may find goodies.

16:13

Focus Priority: Image can only be taken if in focus. Lower end cameras have this ON by default, and it cannot be changed.

16:44

Release Priority: Photos can be taken whenever the shutter button is pressed all the way down, even if subject is partially out of focus. Cameras that can capture many FPS should have this option available. This option is more useful for capturing moving subjects, such as running children, running animals, skateboarders, etc.

16:59
Flash Modes

3:52 Through-The-Lens (TTL): A pre-flash is fired to measure for the correct flash power needed for when the actual exposure is takes place.

7:00 Front-curtain Sync: Flash fires at begininng of the exposure. When in P or A mode, shutter speed will also be set to a fast shutter speed (usually it is at least 1/60th by default) to lessen ambient light and reduce camera shake/motion blur.

7:50 Pre-flashes fire when in TTL mode in order to calculate proper flash power needed.

8:17 Red-eye Reduction fires brighter pre-flashes before the exposure takes place in order to get pupils to contract

9:23 Slow Sync: Flash is combined with a slower shutter speed to capture both fill-flash and ambient light.

13:51 Rear-curtain Sync: Flash fires at the end of the exposure and not at the beginning like in front-curtain sync mode. Rear-curtain sync is useful for capturing a motion blurred trail behind a person as they are walking forward.

16:10 The “X-Sync” is the fastest shutter speed that can be used w/ any given flash (including 3rd party flashes).

For most cameras, the X-Sync is usually 1/250 sec, 1/160 sec, or (rarely) as long as 1/60 sec.

Any shutter speed slower than or equal to the X-Sync will result with the flash properly exposed throughout the entire frame. Anything faster than the X-Sync results with black bars...