

U3A Hillingdon Digital Photo Group

NIGHT & LOW LIGHT SHOOTING

22 January 2018

General Advice

- Think about subjects that you want to shoot at night or in low light, as that affects how you need to prepare to do that.
- Try to learn and understand your camera – what it can do, & what it probably won't cope with, in the context of the above.
- Find out what adjustments you can make i.e. **NOT** to use just the “Programme” (“P”) or Automatic (“A”) settings,
(e.g. adjustments such as “ISO”/“Sensitivity”, Apertures. Shutter Speed. Scene Modes, White Balance, etc.)
- Try to work out what any compromises might thus need to be made, and how to maximise the results
- -> a few reminders from the Jan 2017 presentation may help

“ISO” / “Sensitivity” – *What does it mean?*

- “ISO” “Sensitivity” => the larger the “number”, the more “sensitive” the camera sensor will be at low light levels, *but*:
- Camera sensors vary a lot, but older ones are generally limited to around ISO 400-800 (*maybe 1600-3200, or even 12,800+ for modern sensors?*) for sharp images - above that limit, images will become more & more “noisy”/“blurry” (*“grainy” in film terms!*).
- Test by progressively raising the ISO number and viewing results on your PC screen until you begin to see degradation – *NB: camera’s own display won’t be large enough to see that happen!*
- Now go back to your “maximum usable” ISO setting as the basis for choice of appropriate Apertures & Shutter Speed combinations

“Aperture” (“A”/“Av”) – *What does it mean?*

- “Aperture” => *the **smaller the number**, the more open (“bigger”) is the aperture (“hole”) in the lens, & thus the **more** light enters the camera – (e.g. “f4.0” lets in more light than “f5.6”)*
- A lens has a “maximum Aperture” size (*i.e. smallest number*), and most are between around f2.0 and f5.6
- For most zoom lenses, max Aperture at wide-angle end is larger than at telephoto end *where it thus lets in less light!*
(e.g. a lens stated as “f4.0-f5.6” is f4.0 at the “wide” end but only f5.6 at the “long” end,)
- The wider “open” the Aperture is, then:
 - (generally) the poorer becomes the lens definition
 - Less of the “near-to-far” distance (“depth of field”) is in sharp focus
- The higher the Aperture numbers (*the smaller the “holes”*) are, then, to get the same “exposures”, Shutter Speeds must be lower to stay within the max usable ISO Sensitivity range!

Shutter Speed(“T”/“Tv”): *What does it mean?*

- “**Shutter Speed**” => the higher the “number”, (i.e. *the smaller the fraction of 1s,* -> “1/100” is less than “1/25”), the quicker a shutter opens & closes, *but*:
 - A shorter open period means it “freezes” motion better, *but* to get the same “exposure”, the Aperture f-number must be lower to stay within the usable ISO Sensitivity limit.
 - Low light shots need a Shutter Speed of several seconds plus & *for night-time star shots that may be minutes!*
 - When you want to emphasis movement by blurring, you need to use a lower Shutter Speed than normal
 - Hand-holding at low Speeds is hard, & so you generally need a **sturdy** tripod/ other support, & *a remote control if available*, to avoid blurring. (NB: Cameras or lenses with “Image Stabilisation” (“IS”) should help when handholding, *but IS should be **turned OFF when using a tripod!***)

Focusing

- As mentioned under “**Aperture**”, “depth of field” (*“near-to-far” “sharp image” distance*) reduces as the Aperture (“f”) number decreases – so accurate focusing is important when wide Apertures are used!
- If you leave the camera in **Autofocus** (“AF”) mode, it may want to focus on “something” that attracts its “attention”, especially if that is “brighter”/ “sharper” – *rather than what you actually want it to!*
- So you need to set it into **Manual** focus mode, and then focus manually on what you want to shoot.

“Scene” Modes

- “Scene Modes” are combinations of ISO Sensitivity, Shutter Speed” & Aperture pre-installed in many cameras to make it “easier” to get the correct combination for particular situations – here are some that *may* be appropriate (*many would not!*):



“Scene Modes” - special modes such as **Night scene**, **Fireworks**



“**Night-time snapshot**”: shots of people against twilight/ night

backgrounds by reducing the effects of camera shake, even without using a tripod



“**Indoor**” Prevents camera shake & maintains subject’s true colour (*correct “White Balance”*) under fluorescent/tungsten lights.

“Issues”

- Low light shooting poses many issues, including:
 - Finding subjects to shoot that make interesting images!
 - Judging “correct” Apertures/ Shutter Speeds to use.
 - Shooting buildings interiors with strong light through windows.
 - Lack of detail in unlit areas of shots with bright lights
(e.g. buildings, indoor entertainment venues, fireworks)
 - Shallow “depth of field” from using large Apertures
 - Camera movement (“*Shake*”) from using slow Shutter Speeds
 - Cameras without a “**B**” (“Bulb”) setting limiting slowest Shutter Speeds to less than (say) 1s → long exposures not possible
 - “White Balance” – the type of lighting has significant effects
 - “Reciprocity failure” - *if that exists for digital sensors?*

“White Balance” (“WB”) – *what does it mean?*

- “White Balance” is a way of adjusting for the colour characteristics of light from different sources, such as these

WB SETTINGS	COLOR TEMPERATURE	LIGHT SOURCES
	10000 - 15000 K	Clear Blue Sky
	6500 - 8000 K	Cloudy Sky / Shade
	6000 - 7000 K	Noon Sunlight
	5500 - 6500 K	Average Daylight
	5000 - 5500 K	Electronic Flash
	4000 - 5000 K	Fluorescent Light
	3000 - 4000 K	Early AM / Late PM
	2500 - 3000 K	Domestic Lightning
	1000 - 2000 K	Candle Flame

- If you don’t use the correct WB settings on your camera, you may get pictures with colours different from the actual ones. So, to produce images with true-to-life colours, you should manually adjust the WB settings according to the light sources instead of just using Automatic WB (“AWB”)

“Reciprocity Failure” & long exposure Digital “Noise”

- In film photography **reciprocity** is the inverse relationship between the intensity and duration of light that determines the reaction of light-sensitive material – but it fails with long exposure times & film is under-exposed => “Reciprocity Failure”
- Digital sensors are said to be little affected, but they generate more electronic “noise” under long exposures, which shows up as the equivalent of “graininess” on film – a known issue for long exposures of night skies or complex scenes.

“Deviation” & some Videos!

- You can use your imagination to shoot in low light to get very different or unusual results; e.g.:
 - Very slow shutter speeds to get very long exposures for moving objects, e.g. cars or fairground attractions/rides
 - “Painting with light”
 - Flash
 - Non-flash LED lights
 - Wildlife cams with motion sensors
 - “Stacking” multiple images
 - Motorised astro-tracker tripod &/or telescope mounts
- *So here are some videos to help you try to understand and explore night-time and low-light shooting!*