

Camera theory and lenses

The camera itself.

You will mostly be using Canon DSLRs or one of the two Sony a7s.

Can anyone here please tell me what SANG could stand for?

Shutter

Aperture

Neutral Density

Gain (ISO)

Shutter Speed

Your shutter speed is quite simply, how quickly the camera opens and lets in light. So if we turn to Shutter priority on your camera, you will be able to see visually what is happening, you can hear it opening and closing to.

So for example if you turn the dial to anywhere below 1/30, the shutter will be open for longer than a 30th of a second, which may sound very fast, but in photography terms, this is classed as a 'slow shutter speed'. You will be able to see that your images will come out very blurry / shaky and will be bright. Why are they bright? - longer the camera is open, the more light is let in.

Why are they shakey?

In turn, if you don't keep the camera still with a tripod, you will get motion blur.

Now, if you change the shutter speed to 1/800, what happens to the image?

It becomes sharper, but because it is open for a less amount of time, your image will become darker.

Now in photography, you can get some quite interesting effects depending on what shutter speed you use. However, in film this is a little different, we will move on to that later.

<https://digital-photography-school.com/shutter-speed/>

Aperture

Okay, so can anyone here please explain to me what aperture stands for?

Okay great. Now aperture, in my opinion, is the hardest camera aspect to understand. This is because once again, we are talking about how much light is let in, but wait, is that not shutter speed? No. because this time we are talking about how big the hole is when the shutter snaps open.

Ok. so as you would expect, the larger this hole, the more light is let in, the smaller ---- the less light yes.

However, similar to long and slow shutter speeds, depending on how big this hole is you can get some quite cool effects.

Aperture is measured in F. stops.

Something that is confusing with aperture, is that it is the lower F stop which gives you the wider aperture, which in turn gives you a brighter image. And it is a higher F stop which gives you a narrow aperture, which in turn gives you a darker image.

As you may already know, the aperture is one of the ways to control depth of field.

If you turn your camera to aperture priority, you will be able to see that the wider the aperture, the lower the F stop, the bigger the depth of field will be. Eg, you will get a blurred background.

If you use a narrow aperture, or a higher F stop value, you will get an image with everything in focus.

Now in both photography and film, we often use wider apertures for portrait photography so our audience is focused on the main subject, not the passing by of people or cars in the background. Likewise, depth of field can be used to focus on a particular object vital to your story.

A Narrow aperture is often used for wider shots, or landscapes. For example, in film this may be used for an establishing shot. For example, a lot of drone footage is shot at a narrow aperture to ensure that everything is sharp and in focus.

Okay, so that essentially covers aperture.

<https://digital-photography-school.com/aperture/>

Neutral density

To explain this in the easiest way possible, Neutral density is quite simply sunglasses for the camera. It ensures that the all colours are equally made darker. Why you would want to use a neutral density filter and not instead use a faster shutter speed, we will address later.

Gain

Can anyone explain to me what I mean by gain?

Ok yes, Gain stands for ISO, which in tern is essentially the digital sensitivity of the camera. ASA USED TO BE ON THE FILM. In the same way as when you turn the sensitivity up on a microphone, your sound will eventually become distorted, the same applies for when shooting video. **International Standards Organization**, and it is a standardized industry scale for measuring sensitivity to light.

So i'll move onto this with the others later, but as you can guess, a lower shutter speed will make everything blurry. Therefore we keep the shutter speed the same but instead increase the ISO sensitivity. Now most cine cameras have an optimum ISO. For example, most blackmagic cameras will have an optimum iso of 800 meaning there will be no noise.

However, for these canon dslrs, you may start to see noise after iso 400. The Sony cameras will show less noise, but it will still be an issue.

Frames Per Second (FPS)

Okay, so you now understand the basics of SANG and exposure. Although for photography, that's essentially all you need to know to start shooting in manual, for film this is a slightly different.

This is because we have the addition of FPS. What does this stand for? Frames Per Second, yes.

So can anyone tell me some different frames per seconds that are popular?

16
24
25
30
50
60

120

Right. So the most popular frame rates are^

The standard for film is 24 frames per second.

Then we go into PAL 25fps and NTSC 30 fps frame rates, which from my knowledge are less of an issue in the digital age, but in the past these frame rates had to be like this for PAL tvs in, for example, the UK, worked on a power supply of 50HZ. This meant that the tv was refreshed at a speed of 50 fps. Of course, if the frames per second of the video shot did not match up with the speed of the tv refresh rate, you would have an issue.

NTSC countries simply had a different electricity standard.

However, because of this past, we have kept the standard of PAL countries having TV programmes, mostly sitcoms shot at 25fps and NTSC countries having them shot at 30fps. This is also why these functions show up on the camera in this way too.

For film, the speed is 24 frames per second because this was the best frame rate for an illusion of motion that looks nice.

For example, technically anything above 16 fps will look fluid. However, 24fps is just that little bit more fluid. Similarly, anything above 24fps will look too fluid and break away from this traditional film look we have all grown up with and subconsciously come to relate to cinema. So basically 24fps was chosen for it looked fluid, and it was cheap.

Have people shot at higher frame rates than this? Yes.

But to varied results.

Most famously, Peter Jackson shot the Hobbit in 48fps.

http://www.huffingtonpost.com/2012/12/06/hobbit-motion-sickness-nausea-warner-bros-response_n_2250594.html

<http://theweek.com/articles/469863/why-isthe-hobbit-making-some-moviegoers-sick>

https://www.youtube.com/watch?v=40sMS27QI_w

So basically if you would like to shoot film, you shoot at 24fps. A sitcom, 25fps/30fps.

Again, higher frame rates are also used for slow motion video.

These are usually set so that they can be easily played at 24fps (and so can be divided into it). For example 120fps is what most iPhones shoot slow motion in. This can easily be fit into NTSC standard of 30 fps 4x30. So played back at 4x slower and it fits.

Sports is one of the exceptions for frame rate. It is often filmed at a higher frame rate for two reasons.

To minimise motion blur

So that it can be slowed down

Your frame rate, unless shooting slow motion or an experimental film, will be locked at 24fps.

You may remember that I said shutter speed is a little different in film? As you may have guessed, what other shutter speed you use has to correspond to the frame rate. A shutter speed slower than 1/24 will mean that the same still image will be repeated in frames. A shutter speed higher than 1/50 will mean that movement looks overly sharp.

In film terms Filmic images almost always use a 180° shutter angle, that is, half of the reciprocal of the frame rate.

Therefore, if you are shooting at 24fps, a 180° shutter angle would be 1/48, on dslrs the closest to this is 1/50. So when shooting film on dslrs we have our shutter speed locked to 1/50 and if you are using a cine camera, to make it easier you leave it at 180°. This shutter angle essentially makes it easier for if you decide you frame rate for whatever reason, the shutter speed will always be kept as double that.

It is for this reason that we do not lower the shutter speed when our image is too bright and we want to use a wide aperture to get a high depth of field that we will use a Neutral density filter.

<https://www.filmindependent.org/blog/hacking-film-24-frames-per-second/>

<https://vimeo.com/19603537>

Settings

Okay, so now that you understand all of the basics, what settings should your camera be on?

Your camera settings should be on 1920x1080, 24fps at a shutter speed of 1/50.

ISO, APERTURE and the use of an ND filter are purely your choice, you will change these settings depending on how exposed you want your image to be and how big a depth of field you want.

LENSES

I'm going to touch upon lenses less in depth... (will go over the top of my head.

Camera SHOTS/Framing:

<https://i.pinimg.com/originals/3d/2a/c4/3d2ac4dbe4a15410f008cef1bc641f0a.jpg>
<https://www.nyfa.edu/student-resources/12-most-popular-camera-shots-actors-should-know/>

So the most common shots are:

Extreme long shot for your establishing shots

Medium for standard character talking

Close up for emotion

Extreme close up for tension / comical.

Along with these there is the term of dirtying the frame. This is when you may place someone in the foreground that is blurred.

The 180° rule.

The best way to explain the 180° rule is to imagine that you have two actors.

Your actor on the left, you will always want to have looking through the frame to the right.

And your actor on the right you want to ensure you always have looking through the frame to the left.

The 180° rule essentially ensures that the illusion that they are looking at each other is kept consistently.

Breaking the 180° rule would mean going to the other side of, for example the character on the left, however keeping the same framing. This would now mean that they are to the left of frame looking out to the right, and diminishes the illusion that the two characters are looking at each other.

The 180° degree rule will come to you more naturally, the more film projects you work on. All it does is ensure that you don't break the audience's orientation and understanding of where everyone is in context to the scene.

I feel like the best way to display this is through showing you a tutorial video.

<http://learnaboutfilm.com/film-language/sequence/180-degree-rule/>

TASK:

Your task is to create a short promotional / tour video of the new school block without any use of sound, but thinking of what shots,

Medium for standard character talking

Close up for emotion

Extreme close up for tension / comical.

Along with these there is the term of dirtying the frame. This is when you may place someone in the foreground that is blurred.

You will use. You may film in the study rooms and other classrooms if the teacher gives you permission, but you must do so considerately and in silence.