



In this unit we learn about the sensitiveness of the sensor, its good points as well as its bad points. We also learn about ASA and ISO.

ISO

Recent developments have seen big advances, with many 'smart' features now being incorporated into cameras, and the morphing of SLR (single lens reflex) film cameras into very sophisticated digital SLR (DSLR) cameras with large image sensors, thereby enabling the capture of images of extremely high quality. Also, in the early 2000s simple digital cameras were being incorporated into mobile phones which have since 'matured' into the current generations of smart phones. These are capable of taking photos of similar quality to a true digital camera, and have the added convenience of being able to store and display the images on a reasonable quality screen

Users had become used to the point and shoot style of photography which, for a lot of general shots resulted in acceptable images, but discerning photographers then came to realise that the fully auto system built in to the cameras did not always give the result they required, and it was desirable to alter settings like shutter speed, aperture and ISO, features that were readily available if the automatic systems were disabled.

We will look at each of these settings in detail in this and following lessons. NOTE: In this course I will often be referring to the controls on my own camera, which is a DSLR. Although my camera has many advanced features, in some ways the controls on a DSLR are easier to use and are less reliant on menus for making adjustments. You should find that your camera will have all of the controls to which I will refer but if it is a compact they may be accessed in a different manner. Check your users manual to find out how to disable auto focus and focus manually.

Because cameras have to be multilingual with identification of their controls, camera manufacturers make extensive use of icons. The chart below shows some of the more common ones, but these can change from camera to camera.



The three basic controls

As I mentioned before, to get a correctly exposed image there **has to be the correct combination** of:

- ISO setting
- Shutter speed
- Aperture

Following the exercise that was set in the previous unit you should by now know where to locate the basic controls for your camera. We will look at each of the above settings in detail and see how they effect the brightness or darkness (better called the over exposure or under exposure) of an image. It must be remembered that if one of the settings is changed so must one or both of the other two, because there has to be a correct balance of the three of them to produce a correctly exposed image. In the old film days a hand held exposure meter was used to obtain the correct combination. All cameras now days have an exposure meter built-in that can take over this duty and adjust the settings automatically. While the auto exposure feature gives good results, we can still make use of it after switching off the AUTO function and selecting Aperture priority or Shutter priority. We are now controlling it, rather than it controlling us. In these cameras, in addition to an exposure meter, an auto focus system is provided, enabling the operator to just point and shoot and get a well exposed and sharp image. (Focus will be handled separately as it does not have any effect the exposure but is, of course, of vital importance to the finished image - see the next unit).

In recent years the software contained in the cameras has also provide what is variously called 'intelligent' or 'smart' auto by which the camera not only makes a decision on the basic settings but will also decide which part of a scene to set the set the exposure and focus for, e.g. on a face if one is present in the frame, and if the face is smiling or if the subject is moving. So you might ask "why do I have to know about these settings" or "why can't I leave it set on AUTO?"

As good as the auto features that are built in to the cameras are, there is always a situation or two that can fool the auto function, or in the case of focus, the auto focus may want to focus on an object other than what you want. In these cases it becomes necessary for the photographer to take over some control to obtain the result he or she requires. These situations could be, for example, night photography, sport, nature, portraiture, fireworks and so many other types of subjects.

So we have to learn how to use these alternative features. Fortunately we are not in the 1960s where one had to manually make all these settings with little guidance, or with the aid of a hand-held exposure meter which gave better results, but was still only a guide. The photographer could not always get it right until cameras with TTL (through the lens) metering and focus became available. In those days TTL was mostly confined to the more expensive cameras, but now all cameras have them as standard equipment.

So, do not be scared of 'auto off' settings. Once you have completed this course you will have a good understanding of them and how to use them.

We will also look at composition in images. What are the good points and what are the distractions? In photographic circles, some rules have been developed and we will look at these in more detail in a later lesson.

In the days of film I used to tell people there were two types of photographer, the amateur and the professional; an amateur went out with a roll of film in the hope of getting 35 good shots, whereas the professional went out with 35 rolls of film in the hope of getting one good shot. Now days with digital cameras you should take the professional attitude to your photography because it does not matter or cost you any more if you take 1 000 images and delete 900 of them, you would then end up with 100 top images that you would not have if you went and took only five shots. Just a note: at any sporting event, you will see the same photographers week after week shooting hundreds of shots, and they probably did the same with the same team a few weeks earlier. So you ask, "why"? The answer is simply that he or she is seeking that 'perfect' shot where everything is spot-on perfect.

The ISO Setting

ASA or ISO? The term ASA is a film speed rating system defined by the former American Standards Association. It rated the relative sensitivity of the film to light. A small ASA number meant that the

film was less sensitive to light than one with a higher number. This function has now changed to the International Standards Organisation, (ISO) and is the universal system currently being used. The rating numbers are the same as one another.

I mentioned before that once loading a film into the camera, the photographer had to shoot the whole roll using the same ASA setting that the film was rated at. Common ratings were Kodachrome 50 ASA, Ektachrome 64 ASA, Agfachrome 50 ASA, and some of the monochrome films going as high as about 500 ASA. The lower the ASA number meant the less sensitive to light the film was. This needed larger aperture lenses and/or slower shutter speeds, but high ASA or ISO settings came at a cost; the higher the ASA or ISO used increased grain in films and noise in digital images. In our modern digital era the same thing applies. Higher ISO settings meant that images could be taken in much lower lighting conditions. However the big advantage of digital cameras is that we can set a different ISO setting for each and every individual image.

Most digital cameras give the option to use AUTO ISO or allow you to select from a range of ISO settings (**Note:** the camera must be off-AUTO to enable manual setting of ISO). So you might ask, which one should I use? Firstly, I will suggest you do NOT use the AUTO setting, as you will not be sure what setting the camera is going to use. The camera can be fooled as to what ISO setting to use, for example it will adjust it to make sure of a shutter speed fast enough to hand-hold the camera without evident camera movement. So if you are shooting in low light the camera will want to increase the ISO and this, as I have mentioned,

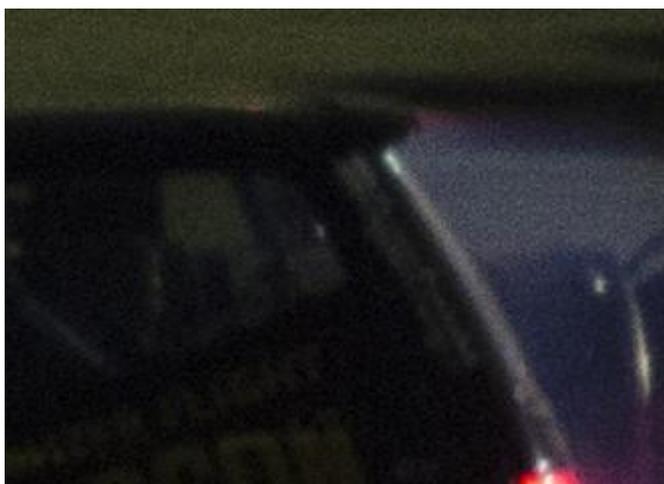
will increase noise. Noise in a digital image is shown up as small coloured dots or flecks and can mostly be seen in the darker areas of the image. The pros and cons will explain why I suggest that you use your own settings. The higher the ISO, the more the noise becomes noticeable and unless you use a good quality editing software that can eliminate it, you will end up with inferior results. I suggest an ISO setting of about 100 - 200 for nearly all your shots. If lighting conditions are not good, or a faster shutter speed is needed, then increase the ISO.

Here is a sample of noise before and after removal, this first image is as-shot:

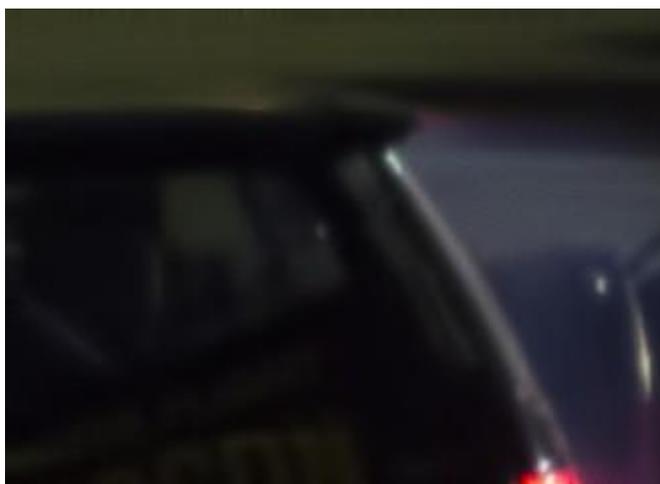


The area within the red box is selected

The above image was shot at ISO 3200, I have enlarged the small area bounded by the red rectangle and when enlarged (below) it shows the noise, evident as a fine speckling, that is mostly noticeable in the dark areas of the image. It is also in the lighter areas and may not be seen like this, but it does detract from the image.



(l) With noise - note the fine speckling;



(r) After removal

This image was shot on 100 32SO showing that noise is always there and will only become more of a problem when using higher ISO settings. Obviously noise will also be more of an issue if the image is enlarged. To remove noise I use Adobe Photoshop CS5 or Topaz De-Noise 5. These are fairly expensive

commercial products, but free software is also available, e.g GIMP (this can be downloaded from <https://www.gimp.org/downloads/>). Both Photoshop and GIMP require a fairly high level of expertise for their use.

When shooting sporting events, or where there is considerable movement in the subject, a higher ISO will allow a higher shutter speed. Therefore be wary but do not be afraid to use higher ISO settings as and when needed.

HOMEWORK

Homework for the week is to take a series of images of the same subject, starting with the lowest ISO number your camera can use, then increase the ISO to the next higher setting for each image. When you have an image on ALL ISO settings load them into your computer and check for the noise. Also note how the camera has altered the shutter speed and or the aperture with each image.

Next lesson we will look at the Shutter Speed and Aperture settings in the camera. Prepare for this now by locating these controls if you haven't already done so. Once again, the camera must be off-AUTO for the controls to be active. Check your manual also for Aperture priority and Shutter priority and how to select them.