

# Photography

*...“the art and science of utilizing radiant energies to form latent images on sensitized emulsions”.*



*An Illustrated lectures series of lessons and articles of interest for the modern photographer.*

Presented by

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PHOTOGRAPHY

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# *Illustrated Lecture Series;* *Understanding Photography*

## **Photo Basics: Exposure Modes, DOF and using Shutter Speed**

Exposure; the basics

We have seen that film and digital CCD sensors both react to light energy, eventually creating an image. Both have built in characteristics, one of which is the optimum amount of light needed to actually create a usable image. The optimum amount of light needed is referred to and the “Sensitivity” and described by the ISO (ASA). Low ISO numbers (32, 64, 100, 200) need more light to take a shot than do higher number ISO films (400, 800, 1000). Low ISO numbers are called SLOW SPEED while higher numbers are called FAST SPEED. The same concept applies to Film and Digital cameras.

The AMOUNT of light needed to take a picture and thus produce optimum density is called the EXPOSURE. This concept becomes very important because many of the modes, buttons and options in our digital camera are dealing with the Exposure. Exposure is defined as controlling the AMOUNT of light that hits the film or CCD Chip. Two key words are CONTROLLED and AMOUNT. Many of the digital camera modes offer us various ways to control the light. The amount refers to brightness and NOT color of the light, or the type of light source.

In the diagram of the camera, the actual Light Meter would be located somewhere in the path of the light (red Arrow). Usually the meter is located on the mirror (#3).

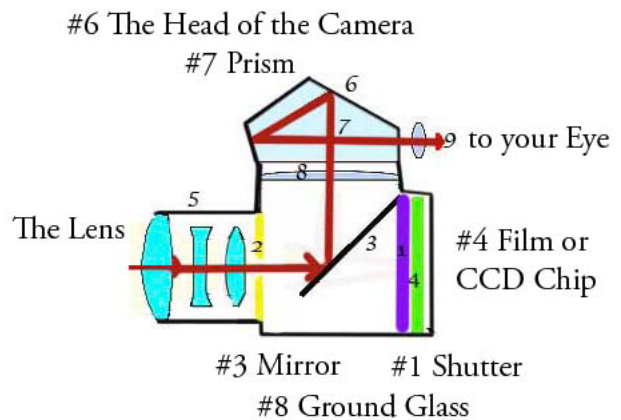


Diagram as seen while you are viewing the image in the viewfinder

In most scenes, the camera “sees” equal amounts of bright areas and dark areas. As the meter measures the amount of light reflected off of these areas, it computes the “settings” for the Exposure (the f/stop and the Shutter Speed). The exposure calculation takes into account the amount of light the CCD chip “needs” to create an image that is the correct density (lightness/darkness). The amount of light needed” is the ISO.



So for instance, if we had ISO 200 set up in our digital camera could we take a picture? How much light does ISO 200 actually need? What happens if the scene is NOT bright enough for ISO 200? Well happily, the camera figures all this out for us.

The first thing the camera needs to determine is the ACTUAL brightness of the scene we are about to photograph. It does this with an device called a Light Meter, which simply measures the AMOUNT of light reflected off of the scene. Take a picture of your Aunt Sally on the beach and MORE light is reflected than if you were to take a shot of her under the shade of a tree. The light meter measures the amount of light available and uses this measurement to CONTROL the amount of light that actually hits the film or CCD chip. The camera need to control the amount of light, because on the beach there is more light (brightness) than we needs to take a picture.

The camera can only reduce he amount of light that hits the CCD chip. It cannot make the light source brighter. That is why we have some difficulties when the light level gets low; think night time, in the gym, theatrical and concerts, the kids recitals. The camera cannot turn up the lights! But it does have two remarkable devices to reduce that overall amount of light that hits the film or CCD chip. Those are called the Shutter and the f/stop (or Aperture).

The process of Exposure is controlling the overall amount of light that hits the CCD chip. It is controlled with the f/stop & the Shutter Speed. The camera takes into account the amount of available light AND the Sensitivity of the CCD chip (the ISO).

The next step is actually setting the f/stop and Shutter speed. How the camera goes about setting these two adjustments is the Exposure MODE.

Digital cameras have various ways of controlling the aperture and shutter speed. All modes give equally good results in the vast majority of photographic situations. However, when you photograph in specific kinds of situations, each of these exposure modes may have certain advantages. Here are modes you may want to look for although it can be complicated by the way camera companies use different names for the same things.

**Automatic mode** sets the shutter speed and aperture without your intervention. This mode allows you to shoot without paying attention to settings so you can concentrate on composition and focus. In this mode you typically cannot change ANY settings, the camera automatically sets:

Aperture & Shutter

ISO

White Balance

Focus

Flash

**Scene modes**, which go by a variety of names, have preselected settings for specific situations such as landscapes, portraits, night portraits, sports, and close-up photography. On some cameras the number of these settings has gotten a bit out of hand since there are so many you have to select them from a menu.

**Programmed mode** is just like full auto in that it sets the aperture and shutter speed for you so you can concentrate on composition and action. But, when in this mode you can intervene. That is you may be able to change the ISO, the Flash options, the White Balance, etc.

**Shutter-priority mode** lets you choose the shutter speed you need to freeze or deliberately blur camera or subject movement and the camera automatically sets the aperture to give you a good exposure. You select this mode when the portrayal of motion is most important. For example, when photographing action scenes, such as those encountered by wildlife photographers, sports photographers, and photojournalists, shutter-priority mode might be best. It lets you be sure your shutter speed is fast enough to freeze the action or slow enough to blur it.

**Aperture-priority mode** lets you select the aperture needed to obtain the depth of field you want and the exposure system automatically sets the shutter speed to give you a good exposure. You select this mode whenever depth of field is most important. To be sure everything is

sharp, as in a landscape, select a small aperture. The same holds true for close-up photography where depth of field is a major concern. To throw the background out of focus so it's less distracting in a portrait, select a large aperture.

**Manual mode** lets you select both the shutter speed and the aperture. You normally use this mode only when the other modes can't give you the results you want. Some cameras have a bulb setting in this mode that lets you capture time exposures such as light trails at night. In this mode the shutter remains open as long as you hold down the shutter button. If it's open for more than 1 second, noise in the form of randomly-spaced, brightly-colored pixels may appear in the photograph. To reduce noise at slow shutter speeds, turn on noise reduction if the camera has it.

**Custom settings mode** on high-end cameras lets you store personal settings. If you use the same settings over and over again it may be worthwhile saving them for future use. Some cameras let you save one or more sets and then instantly access them at any time just by turning a mode dial. Storing your own settings is as simple as setting the camera the way you want it and then selecting the menu's command that assigns them to the custom setting.



These images show the top of the camera with the dial to set the Exposure Modes. On the far left camera, you would depress the "Mode" button to access the Modes Menu. The other cameras have a dial to make that selection.



## *Too Many OPTIONS!!!!*

The camera Manufactures have gotten way out of hand with the options here. They do this mainly to sell cameras, but the end result is confused photographers. My advice is to make life easier and eliminate some of these options.

The goal of us as photographers is to control the image. We often get shots that are technically not good, or at least not what we wanted. Often the images are not what we saw, or more importantly, what we envisioned the image to look like.

Remember, we are trying to translate a 3 dimensional world, complete with the input from our senses (sounds, smells, cold, heat, moisture) and our emotional feelings about the environment... we are trying to convey all of this into a 2 dimensional image. Tough task at best. In order to do this we MUST control the image.

We can control what is in focus AND what is blurry.

We can control the color of the image.

We can control the composition of the image. We can control the density of the image ( lightness / darkness).

We can control WHERE the viewer “looks” and what he notices, what part of the scenes are less important.

We use the tools of the camera to control the image:

Color is controlled with the “White Balance”... More on this later

The exposure... the Aperture and the Shutter speed controls and effects everything else.

This is a preview of “Exposure Modes”.  
The lesson you purchase has over 16 pages of information, diagrams and images that fully explain your cameras modes and their use.