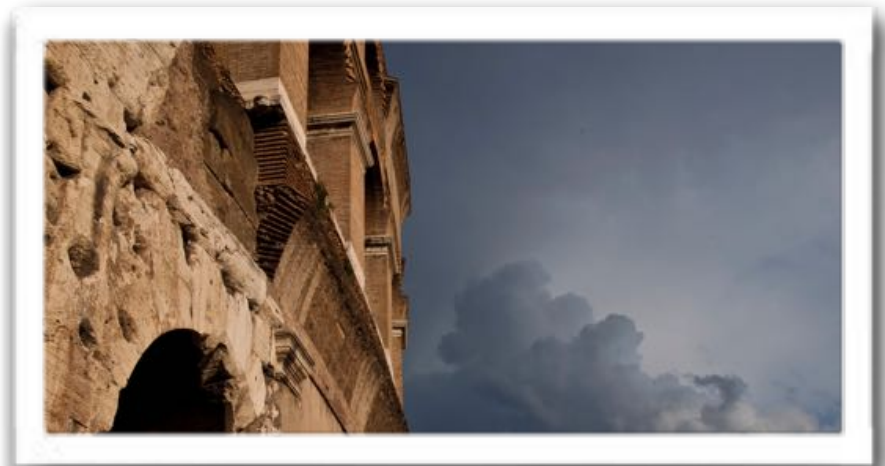
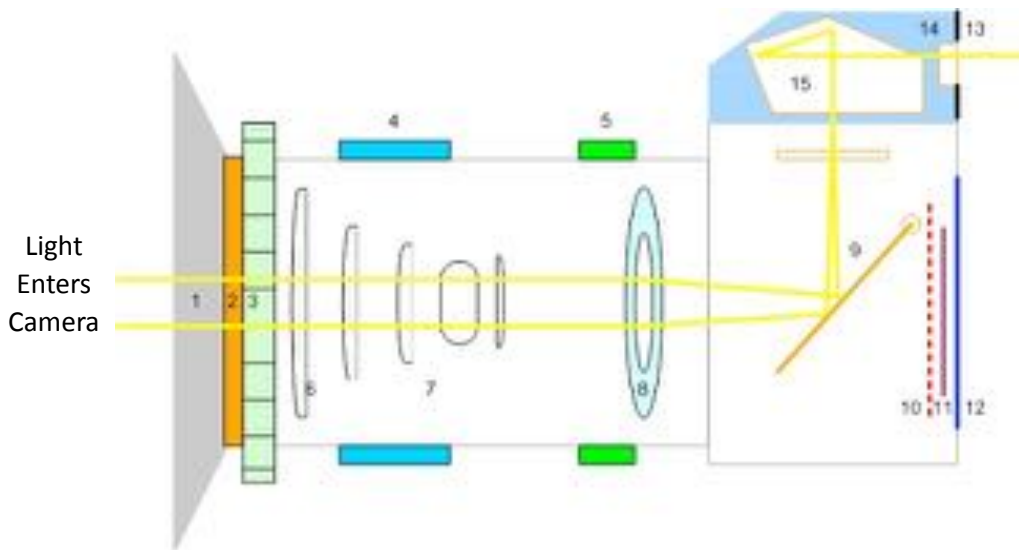


Digital I

Course Notes



Anatomy of a DSLR



1. Lenshood: Used to control additional light entering the lens.
2. UV filter that is purchased separately from the lens. Screws onto the front of the lens and is primarily protection for the lens.
3. Manual focus ring for most cameras. Not accessible in most autofocus settings.
4. Zoom ring that increases or decreases magnification of the lens.
5. Manual focus ring (some cameras only).
6. Objective Lens (front of lens).
7. Lens elements inside the lens that focus the light onto one point.
8. Aperture that the user controls to allow a specified amount of light to the sensor.
9. Mirror in the down position to allow viewing through the viewfinder. During a photograph the mirror flips up and exposes the sensor to light.
10. Shutter that opens to expose the sensor to light.
11. Image Sensor sometimes referred to as a charge-coupled device (CCD) or a complementary metal-oxide-semiconductor (CMOS). The sensor converts an optical image into an electronic signal.
12. Liquid Crystal Display (LCD) screen that displays information and sometimes the picture.
13. Viewfinder.
14. Diopter device that allows the viewer to adjust the focus through the viewfinder. Designed for people with corrective lenses.
15. Pentaprism that reflects light from the mirror and translates it into a correct image through the viewfinder.

DSLR Advantages

A Digital Single Lens Reflex (DSLR) camera has many advantages compared to a compact point and shoot.

Control

The main advantage a DSLR camera has over its compact cousin is the ability to control the way the camera takes a photograph, and hence; emphasize specific elements of a picture. With a DSLR, the user is able to control all aspects of the camera including the aperture, shutter speed, ISO, white balance and a whole host of other characteristics. In fact, DSLRs have hundreds of options that the user can customize at the touch of a button. Most modern DSLRs have a fully automatic shooting mode, making them great for beginners who can learn functions over time at their own pace.

Speed

DSLR cameras are speedy and ensure that those special moments are captured. Not only does a DSLR camera have a faster autofocus, they also use an almost instantaneous shutter release that allows the photographer to time their pictures impeccably for special moments (e.g. sporting events, newly married couples' first kiss, surprise birthday celebrations etc.).

Lenses

One of the fundamental advantages of the DSLR system is the ability to use interchangeable lenses. The DSLR photographer has many lenses at their disposal for different situations. A macro lens excels at close-up photographs, low light lenses are great for indoor or late evening light, and fisheye lenses open another world of photography. Each lens also has their own specific quality and characteristics, and using the right hardware will help to create the correct effect for the photograph.

Low Light – Sensor size and ISO engine

A DSLR camera can make good use of low or indoor lighting for photographs without an external light source (i.e. flash) unlike a compact camera. This is mainly attributable to a larger aperture, sensor size and better ISO engine.

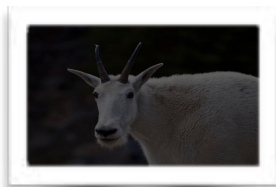
File Handling

DSLR cameras are able to handle a number of different file formats. Like a compact camera, DSLRs can produce beautiful JPEG files ready for download. Unlike a compact camera, however DSLR cameras can also produce Raw files. Raw files are not compressed and contain a wealth of information (much more than their JPEG counterparts). While almost always never looking as good as the JPEG out of the box, raw files are vastly superior for post processing. Note that Raw files do not contain any information on white balance, tone curves, contrast, colour saturation or sharpening. If you plan on any post-processing, then raw files are the best format to photograph in.

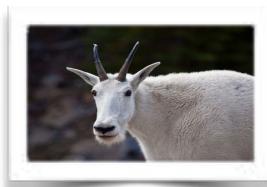
Exposure

Exposing a photograph is a bit like baking. In the search for a perfectly sweet dessert, you can choose to use a variety of different sweeteners - white sugar, brown sugar, honey, etc. With different ratios of each ingredient you will eventually find a combination that works.

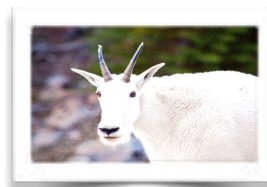
Exposure in photography terms is very similar. Like your dessert, the photograph is 'sweetened' using light. Letting the right amount of light in will ensure that your photograph is exposed properly and not under or over exposed.



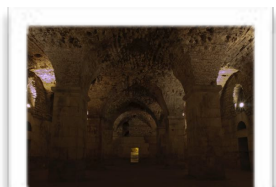
Underexposed



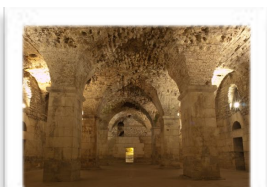
Perfect Exposure



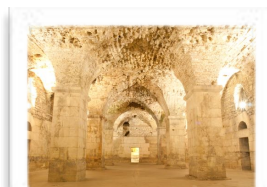
Overexposed



Underexposed



Perfect Exposure



Overexposed

Exposure Cont'd

A DSLR controls the photographic exposure using a mixture of the following three fundamental tools.



Aperture

- Aperture is the size of the opening in the lens that the light travels through.
- The size of the aperture is commonly measured by a number known as an “f-stop”.
- The actual f-stop number is derived by taking the focal length and dividing it by the effective diameter. Contrary to intuition, this means that the larger the aperture, the smaller the f-stop number (e.g. f/2.0 lets in more light than f/22.0).
- The diameter of the aperture is related to the f-stop number (e.g. f/2.0 has twice the diameter of f/4.0). Note that because light passes through the area of the opening, twice the diameter is closer to four times the amount of light passing through the aperture.

Shutter Speed

- Shutter speed is a measure of the time that the camera shutter is open to expose the sensor to light.
- The longer the shutter is open, the more light the sensor receives.
- Shutter speed is measured as a fraction of a second, so depending on your camera you will either see a fraction (like 1/200) or you will see a number, which implies a fraction (like 200, which means 1/200th of a second). Once you go above 1/10th of a second, this display will change. Often it looks like 0"4 - which means 0.4 seconds. One second and beyond is displayed with “ marks, so 5" means 5 seconds. Remember, the BIGGER the fraction, the FASTER the shutter speed (1/1000 is FASTER than 1/200).

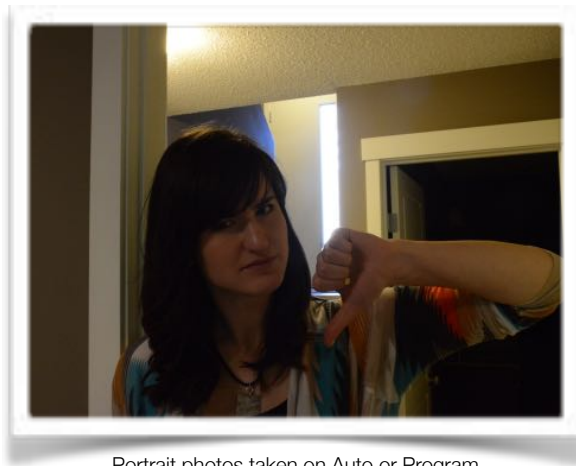
ISO

- ISO stands for the International Standards Organization.
- It is a measure of the sensitivity of the camera sensor to light.
- ISO is a handy tool to manipulate the shutter speed of the camera and especially useful for hand held low light photography or capturing fast motion.
- Be cautious of using high ISO number as these tend to introduce noise into a photograph.

Shooting Modes

Automatic or Program Mode (Auto or P)

- Mode of choice for ease of use.
- The camera automatically chooses the aperture, ISO and shutter speed setting for the picture.
- Auto mode will automatically pop the flash in low light conditions. In program mode, the user must selectively raise the flash.

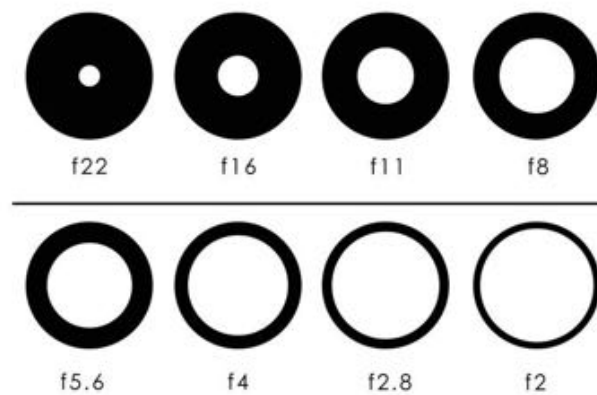


Portrait photos taken on Auto or Program settings tend not to produce the results the photographer was hoping for.

Shooting Modes Cont'd

Aperture Mode (Av)

- Most commonly used mode in a DSLR.
- The photographer will set the ISO and select the aperture and then camera adjusts the shutter speed to aim for that perfect exposure.
- Use the scroll wheel most-often located at the top of your camera to control the aperture.
- A small aperture (opening) means a large F-Stop.
- A large aperture (opening) means a small F-Stop.



- A small aperture (large F-Stop) will mean a slower shutter speed than a larger aperture (small F-Stop).
- Use aperture to control the depth of field. A larger aperture (small F-Stop) will result in a shallow depth of field (blurry). This is useful for drawing attention to a subject in a photograph.



Control depth of field through manipulating the aperture

Shooting Modes Cont'd

Shutter Speed (S or Tv)

- Shutter speed is selected by the user and the camera adjusts the aperture accordingly.
- Depending on the light conditions, the aperture that the camera selects will have an effect on the depth of field.
- Useful for capturing motion or streaming lines.



Fast shutter speeds freeze sports actions



Slow shutter speeds give the appearance of a single, flowing stream of water

Shooting Modes Cont'd

Manual (M)

- Fully manual option.
- User selects ISO, Shutter Speed and Aperture.
- Most SLR cameras have an exposure indicator to illustrate how far from standard exposure the user settings are.
- Images are perfectly exposed when the indicator is on Zero (0).



- Most cameras allow users to select a shutter speed of up to 30 seconds. Photographers can use the Bulb setting, along with a shutter release (and timer of some sort) for exposures beyond 30 seconds.
- Manual mode is most useful for situations outside of the norm (e.g. long exposure).



Full Manual mode with bulb exposure of 3 minutes and 20 seconds.

Auto Focus and Focus Points

Auto versus Manual Focus

- DSLR cameras have the ability to auto and manual focus.
- Manual focus allows the photographer to use the fine focus ring to dial in the focus.
- Auto focus allows the camera to dial in the focus automatically.
- Manual / Auto focus can be selected on the lens - usually by a switch on the side of the lens.

Focus points

- When Auto focus is selected, the user can tell the camera what specific points within a photograph to focus on.
- The three main options for using focus points are:
 1. Auto focus points - this option allows the camera to choose what it thinks is the 'best' point within the frame to focus on.
 2. Middle focus point - when the middle point is selected as the main focus point, you have the ability to focus on your subject, half-press the shutter to lock the focus, and recompose the photograph to suit your preferences before taking the photo.
 3. Moving focus points - this allows the user to change the focus point to the location of the subject before taking the photo. So, if when taking a portrait photograph, your subject is standing on the left hand side of the photo, the left most point can be selected. This will instruct the camera to focus on whatever is at that left hand point in the photograph.



Versus



Low Light / Indoor Photography

- Low light photography can be challenging but rewarding at the same time.
- Low light photographs have a very distinct feeling as compared to using an artificial light source such as a flash. The ambiance of the location is retained.
- Use a tripod when available or rest the camera on something solid for best results.
- If the photograph is handheld, it is important to ensure that the shutter speed is fast enough to prevent shake. Try opening the aperture, and increasing ISO to increase the shutter speed. Remember that the slowest shutter speed is the reciprocal of the focal length (e.g. if you are shooting at 50mm, the slowest shutter speed will be 1/50th of a second handheld)
- Use vibration reduction or image stabilization if possible.
- Many DSLRs have trouble autofocusing in the dark. Try focusing on an area of contrast that is better lit or manually focusing the photo if you are having problems.
- Some DSLR have a built in strobe to help the autofocus.



The above photograph was taken handheld at ISO 800 and f/3.0 aperture. The corresponding shutter speed was 1/50th second at a 60mm focal length.

White Balance

White Balance

- White balance is the adjustment made by a DSLR to automatically adjust object colour correctly regardless of lighting source (e.g. sun, shade, fluorescent or incandescent light).
- White balance is measured on the kelvin scale between approximately 1000k and 10,000k. Daylight setting is approximately 6000k. Higher kelvin numbers will result in a cooler picture and lower kelvin numbers will result in warmer tones.
- White balance can be used as a creative tool to add colour elements to a picture.
- Note that raw files do not maintain white balance information.
- Most DSLRs have a mode to set white balance based on identifying an object that is grey, white or black for the rest of the shoot.



Two pictures taken within seconds. Note the colour difference due to changing the white balance.

Composition

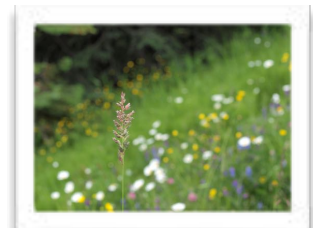
Rule of Thirds

One of the basic rules of photography, the rule of thirds emphasizes the need for subjects or areas of interest to be placed at an intersection of thirds. Apply both horizontally and vertically. In the picture to the right, the sail boat is one third of the way from the left side and the sails are one third of the way up from the bottom.



Depth of Field

One of the easiest ways to create focus on the subject is to use a shallow depth of field. The blade of grass closest to us is emphasized through the use of a shallow depth of field behind it.



Framing an Image

Framing provides a sense of perspective as well as drawing attention to the subject. The leaves in the foreground frame the picture and create a sense of distance from the roofs of Dubrovnik.



Leading Lines

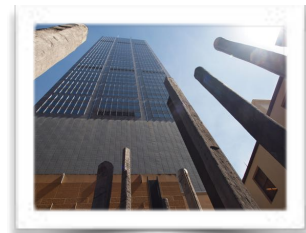
Lines in a picture that help to draw a viewer's eye to the subject in the picture. The fence in the picture to the right draws the viewers eyes to the Cathedral.



Lens Distortion & Compression

Perspective and Distortion

Many lenses have some kind of distortion. This can be used to emphasize a specific element of the picture. For example, a retracted wide-angle lens will tend to make objects in the foreground much closer and objects in the background look much farther away. This can be used to emphasize the size, length or height of an object as can be seen on the right.



Lens Compression and Portraits

The opposite of lenses is also true. Taking a photo with a retracted wide-angle lens will make things look distortedly large / long / wide. Taking a photo with a zoom lens at maximum zoom will tend to make things look more compressed. It will bring backgrounds closer to foregrounds, make objects look shorter, and generally make things look more natural (less distorted).



This is particularly important to remember when taking portrait photographs. Using a wide angle lens in a fully retracted position will make your subject look wider (yes, fatter). Using a zoom lens (and zooming in) will make your subject look more normal, proportional and will tend to compress any features that they are not fond of (like large ears, or a wide nose). Try to keep this in mind when taking photographs of people you like.

Thank You!

From all of us at Learn Photography Canada we would like to THANK YOU for choosing us! If you have any comments or feedback from our courses we would be delighted to hear from you.

Thanks again!



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Consider building on the skills that you learned in Digital I. Our Next Generation Digital II course will refine and enhance your photographic knowledge. This course focuses on using light and how photographers can make the most of the light that is available to them to get the very best photographs. You will cover topics such as using back/front/side light, the difference between artificial and natural light and how to identify contrast lighting situations.

In Digital I you learned how to control your camera: let us now teach you to how tell your story!

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