* **Two types of cameras used in this class:**
* 1. Point & Shoot
* 2. DSLR (Digital)
* **Compare & contrast these two:**
* 1. Point & shoot cameras are easier, cheaper and more convenient.
* 2. DSLR cameras are more complex & expensive but you have more options when working with them.
* **5 Important parts of the camera:**
* 1. **The body**, which serves as the home for the camera.
* 2. **The flash or memory card** where you store your images.
* 3. **The lens.** This is the eye of the camera, and it's a very complex instrument. Different lenses can provide many different features, so it's important to know the differences between them.
* 4**. The sensor**, which is basically, the digital equivalent of film, in the sense that—like film—it is exposed to light that comes through the lens and it records that exposure.
* 5. **The battery**, which powers the camera and just about every other electronic device.
* **Breakdown of the 5 parts:**
* **Part 1- The Body**
* The body is the housing for your camera. While it has little effect on the quality of your photos, it does affect things like ease of use and comfort.
* **Part 2-The Flash or Memory Card**
* Memory cards are what film used to be. Like film you need to be careful with the cards, as they are sensitive to heat and moisture.
	+ There are two types of cards:

1. SD-Smaller & easier (for Point & Shoot)

* + For SD cards you'll be best served by a Class 6 card.

2. CF- Compact Flash (for DSLR)

* + For CompactFlash, a card rated at 133x should do just fine.
	+ Cards are fragile- be careful putting in or taking out of the camera. There are pins inside that can be bent & they are costly to replace. Find ones that are steel plated over plastic for extra strength.
	+ Size variety: Your camera dictates what size. 8-16 gigabytes is good. 500-1000 pictures.
	+ Light variety: means light speed. The faster the light speed the more expensive. An average is fine (about ). You will know it’s too slow if you get a busy message on your screen.
* **Part 3- The Lens**
* This is the eye of the camera, and it's a very complex instrument. Different lenses can provide many different features, so it's important to know the differences between them.

**Types of Lens’:**

* + 1. **Zoom–vs-Prime**: Certain types of lenses are better for certain situations, so it's important to know their classifications and differences. The first thing worth noting is the difference between zoom lenses and prime lenses.
		- **Zoom lenses**—as you can probably guess—let you zoom in and out. While they have that advantage, they're generally more expensive, heavier, and larger.
		- **Prime lenses**- *do not* allow you to zoom, but they're often cheaper, lighter, and smaller. In many cases, prime lenses will provide sharper images than zoom lenses at lower price points. When you start paying thousands of dollars for lenses, lens performance tends to be a little more equal.

**Types of Lenses based on a lens' focal length:**

* + Focal length is measured in millimeters (mm) and you can think of it like the amount of magnification. A low number is like being zoomed really far out, and a high number really far in.
	1. **Standard-** These lenses are generally between 35-50mm and tend to most closely represent space the way the human eye sees it. Wide-angle lenses tend to distort space and add the appearance of more depth. Standard lenses are the middle ground and produce images that look realistic to most people.
		1. A 50mm prime lens is often the cheapest lens you can buy with a level of quality that rivals zoom lenses priced at several hundred dollars more.
		2. Standards are the most versatile lenses because they're a good compromise between the more extreme types, but they're often useless when you're in a small space and need to go wide or are far away from your subject and need the magnification power of a telephoto.
	2. **Telephoto-** This type of lens flattens space & is what you need if you are zooming in really far. Pretty much anything over 100mm is considered a telephoto lens, and anything over 400mm is considered an ultra telephoto lens. While telephoto lenses can magnify an image many times over, and are necessary when you can't get close to your subject, they're both heavy, are more subject to motion blur (as a result of camera movement), and do not perform as well in low light. You will find some options that are compact, come with image stabilization (to prevent motion blur), and offer wider apertures (to perform better in low light), but all of these features increase their cost significantly.
	3. **Wide-Angle Lenses-** These are essentially any lenses with a focal length of up to 35mm. The wider the lens (and lower the focal length), the more the lens can see.
		1. Fisheye lenses are extremely wide and often have a rating of around 8-10mm.
		2. A regular wide-angle lens is generally around 14-28mm.
		3. Wide-angle lenses capture more stuff in the frame. They also distort space; increasing depth and making it look more spherical. This can be both a wanted and unwanted effect, depending on the circumstances.
	4. **Medium Lenses-** These lenses generally fall into the range of 60-100mm and are generally not a type you'll want as a prime unless you have a specific purpose in mind (some prefer 60mm and 85mm prime lenses for portraits, for example). This range is often encompassed by zoom lenses, and that's generally where you'll want it. Many standard zoom lenses start as wide as 28mm and end up at 70mm, at least. A good standard zoom will encompass this range.
* **Part 4- The Sensor**
* The sensor is the part of your camera that captures the light exposure filtered through the lens. It is the image. The way the sensor was produced, and how large or small it is, has a pretty big effect on the end result: your photograph.
	+ The size of the sensors matters. Compact point-and-shoot cameras have very small sensors and the difference in size between them is a smaller factor when choosing a camera. When it comes to cameras with interchangeable lenses, which include DSLRs cameras.
	+ Generally larger sensors provide better low-light performance, greater control over depth of field, and produce higher resolution images with less “noise” or grain than a smaller sensor.
* **Part 5- The Battery**
* Most DSLRs pack a battery that will last you all day, but compact point-and-shoot don't necessarily come with that luxury. It’s a good idea to have a second one just in case and always remember to have it charged and ready to go!!!!
* **How to Clean & Care for the Lens**

Materials needed:

* + - 1. Air blower- To remove dust
		- 2. Microfiber cloth- Do not use anything else!!!!
		- 3. Lens Cleaner- Same!
	+ Always clean lens and viewfinder or LCD screen gently.
	+ It is a great option to keep a protective filter on your camera lens. Especially if you are carrying around your camera a lot. These tend to be inexpensive and protect the lens if you are in the middle of a shoot and drop it!
	+ There is even a protective cap for your LCD screen available.
	+ Also- DO NOT LOSE YOUR LENS CAP!!!!!!
* Digital files like pictures are very big and take up a lot of space in your computer.
* **Here are some options for storing your images**:
* 1**. Google Drive:** Automatically back up and sync your photos and videos to Google Drive by turning on Auto Backup. You can back up items like:
* Photos you take with your device’s camera & photos you save on your computer.
	+ You will be using Google Drive to turn in assignments so this method will work great.

**Storage & cost-** Remember Photos use space in your Google Account. Your photos and videos are stored using your Google Account's storage space. You have 15 GB of free storage, but you can [buy more](http://google.com/settings/storage%22%20%5Ct%20%22_blank). Remember video takes a lot of space!!!!

**Space used depends on your storage setting and which product you use**

* + Items uploaded via Google Drive count against your storage quota, regardless of size.
	+ Items uploaded via Google Photos:
	+ **Don't** use quota if they're stored in "High quality."
	+ **Do** use quota if they're stored in "Original quality."
* 2. Other cloud-based options like drop box & iCloud.
* 3. External Hard Drive: If you have a lot of stuff on your computer, this might be a good investment.
* 4. Flash drives: Can be used to store pictures, look for larger capacity options.
* 5. Print: Good old-fashioned hard copy pictures are always a great option. Keep a book of your favorites!
* **File Size –vs- File Type**
* **Two File Types: Raw or JPEG**
* 1. **Raw-** Unprocessed, uncompressed (to be made smaller), harder to send.
* 2. **JPEG-** Universal, Compressed, processed in the camera…easy!!!!!
* **File Size:**
* When choosing size always go with larger. Larger means best quality!!!!
* **Software for editing:**
* **Free Options:**
* See: http://www.makeuseof.com/tag/10-easy-use-photo-editing-programs-newbie-photographers/
* Picasa
* Gimp
* Photos for Mac
* Sumo Paint
* **Low Cost:**
* Pic Monkey
* **Adobe:** Adobe offers great options arguably the best.
	+ **Adobe Photoshop Elements**: is a great option for beginners & is good on a Mac or PC. $
	+ Adobe Light Room: Is a level for more advanced photographers. $$
	+ Adobe Photoshop CS6- Advanced to professional level. $$$
* **1. Shooting modes**
* The shooting modes will most likely be found on a dial labeled with ‘auto, Av, Tv, P, M’ and maybe more.  Selecting a shooting mode will determine how your camera behaves when you press the shutter, for example, when ‘auto’ is selected, the camera will determine everything to do with the exposure, including the aperture and shutter speed.  The other modes, ‘Av, Tv, P, M’, are there to give you control. If you are unfamiliar with photography Auto mode is a good place to start.



Your mode dial may have the letters ‘A, S, P, M’

(Instead of Av, Tv, P, M), it’s all the same.

* + ***Aperture Priority (Av (Cannon or A Nikon)***Aperture priority can be thought of as a ‘semi-automatic’ shooting mode.  When this is selected, you as the photographer set the aperture and the camera will automatically select the shutter speed. ***This is what photographers use 95% of the time. Just remember if you are in this mode you need to adjust the aperture and the ISO/ film speed as well.***
		- ***ISO 100 (bright outdoors) to 800 (Dark interior)***

 ***What is aperture and when would you want to control it?***

The aperture is the size of the opening in the lens through which light is allowed to pass whenever the shutter is opened – the larger the aperture, the more light passes through***.***

The aperture is measured in ‘f-stops’ and is usually displayed using an ‘f-number’, e.g. f/2.0, f/2.8, f/4.0, f/5.6, f/8.0 etc, which is a ratio of focal length over diameter of the opening.  Therefore, a larger aperture (a wider opening) has a smaller f-number (e.g. f/2.0) and smaller aperture (a narrower opening) has a larger f-number (e.g. f/22).  Reducing the aperture by one whole f-stop, e.g. f/2.0 to f2/8 or f/5.6 to f/8.0, halves the amount of light entering the camera.



**Aperture is one of the most important aspects of photography as it directly influences the depth of field – that is, the amount of an image that is in focus.**  A large depth of field & hyper focus (achieved by using a small aperture (large f-number)) would mean that a large distance within the scene is in focus, such as the foreground to the background of the landscape below. A low number gives a dreamlike quality or blur.

**Shutter Priority (Tv or S)**Similarly to aperture priority, this is another ‘semi-automatic’ shooting mode, though in this instance, you set the shutter speed and the camera will take care of the aperture.  The shutter speed, measured in seconds (or more often fractions of a second), is the amount of time the shutter stays open when taking a photograph.  The longer the shutter stays open, the more light passes through to the sensor to be captured.

* + You would select a short shutter speed if you wanted to freeze a fast moving subject, such as shooting sports, action or wildlife, for example a bird in flight.
	+ You would use a long shutter speed if you wanted to blur a moving subject, for example water rushing over a waterfall (slower shutter speeds will require you to put the camera on a tripod to ensure the camera is held steady whilst the shutter is open).

*Aperture and shutter priority shooting modes may be semi-automatic, meaning that some may deride their use because they’re not fully manual, however they are incredibly useful modes to shoot in that can give you enough creative control to capture scenes as you envisage them, especially as amateurs.*

**Program (P)**Program mode is halfway between the semi automatic modes of aperture/shutter priority and full manual control.  In program mode, you are able to set either the aperture or shutter speed, and the camera will maintain the correct exposure by adjusting the other one accordingly, i.e. as you change the aperture, the shutter speed will automatically change, and vice versa.  This gives you additional freedom that using either aperture priority or shutter priority cannot give without switching between shooting modes.

**Manual (M)**Manual mode is exactly what it sounds like, you are given full control over the exposure determination, setting both the aperture and shutter speed yourself.  There will be an exposure indicator either within the viewfinder or on the screen that will tell you how under/over exposed the image will be, however, you are left to change the shutter speed and aperture yourself to ensure you achieve the correct exposure.

*\*As a first step to taking your camera off ‘auto’, aperture priority and shutter priority modes offer two very simple ways to start to understand how the different setting impact your images and are a perfect starting place for learning how to use your camera more creatively.*

* **ISO- Film Speed**
* ISO is a measure of how sensitive the sensor of your camera is to light.  The term originated in film photography, where film of different sensitivities could be used depending on the shooting conditions, and it is no different in digital photography. The ISO sensitivity is represented numerically from ISO 100 (low sensitivity) up to ISO 6400 (high sensitivity) and beyond, and controls the amount of light required by the sensor to achieve a given exposure
* At ‘low’ sensitivities, more light is required to achieve a given exposure compared to high sensitivities where less light is required to achieve the same exposure.
	+ ***Low ISO numbers***If shooting outside, on a bright sunny day there is a lot of available light that will hit the sensor during an exposure, meaning that the sensor does not need to be very sensitive in order to achieve a correct exposure.  Therefore, you could use a low ISO number, such as ISO 100 or 200.  This will give you images of the highest quality, with very little grain (or noise).
	+ ***High ISO numbers***If shooting in low light conditions, such as inside a dark cathedral or museum for example, there is not much light available for your camera sensor.  A high ISO number, such as ISO 3200, will increase the sensitivity of the sensor, effectively multiplying the small amount of available light to give you a correctly exposed image.  This multiplication effect comes with a side effect of increased noise on the image, which looks like a fine grain, reducing the overall image quality.  The noise will be most pronounced in the darker/shadow regions.
	+ *Most digital SLRs now have an ‘auto-ISO’ function, where the camera sets the ISO depending upon the amount of light in which you are shooting, keeping it as low as possible.  Auto-ISO is a very useful tool when starting out with your camera, as it is allows you to define an upper limit i.e. where the images become too noisy such as ISO1600 or 3200, and then forget about it until situations where you specifically want to override the automatic setting, for example if taking landscape images using a tripod, you can afford to use the lowest ISO possible.*
	+ **Focusing**
	+ Regardless of what shooting mode you are using, or what ISO you define, the chances are there will be a subject of your image that you want to have in focus.
	+ ***Autofocus modes***DSLRs come with a range of autofocus modes, however, for simplicity, the two that are most important to understand are **AF-S and AF-C**
	+ **AF-S** – autofocus-single.  This is best used when taking photos of **stationary subjects** such as portraits of people, landscapes, buildings etc.  When you half-press the shutter, the focus will be acquired and locked on that point for as long as you hold the button down.  If you want to change to focus, you need to release the button, recompose and then re-half-press.
	+ **AF-C** – autofocus-continuous.  This is best used when taking photos of **action or moving subjects** such as sports and wildlife.  When you half-press the shutter, focus will be acquired and locked on to a given subject.  When that subject moves, the focus will adjust with it, refocusing all of the time until the photograph is taken.

*(These modes are not to be confused with the AF/MF switches on the lens, where AF stands for autofocus and MF stands for manual focus.  That switch is an override for if you want to manually focus your lens.  If you want to make use of the autofocus modes discussed above, ensure the lens is set to AF).*

* + ***Focus Points***Both of those focus modes rely on what are known as focus points.  When you look through the viewfinder, you should see a number of squares/dots overlaid across the screen.  When you half-press the shutter, you should see one of these squares be highlighted in red.  That is the active focus point, and it is that position within the frame that the camera is focusing on.

*Initially, set your camera to use a single focus point (your camera manual should tell you how to do this).  This way, you will be able to choose what you are focusing on, ensuring that the subject you want to capture is in focus.  Once you are familiar with the basic focusing modes and focus point selection, you can then explore the more advanced modes that your camera may offer.*

* + **Quiz Next Class on this material- Study!!!!!**

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