

Technical Brochure: 2016

Basics of photography for scientific professionals of KVKs



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Prologue:

Science is generally defined as knowledge attained through study or practice. Some researchers say Science is territory of truth and it always needs a convincing evidence to prove the theory. Researchers document the evidences, observations and results in the form of words i.e. text which may or may not be convincing all the time. Therefore it is always ideal to support scientific text with relevant picture / photograph. A Chinese philosopher quoted that “*A picture is worth a thousand words*” and it’s very true in all experiential spheres of day to day life. Photographs communicate idea or information very strongly to readers and it also helps them to retain the same.

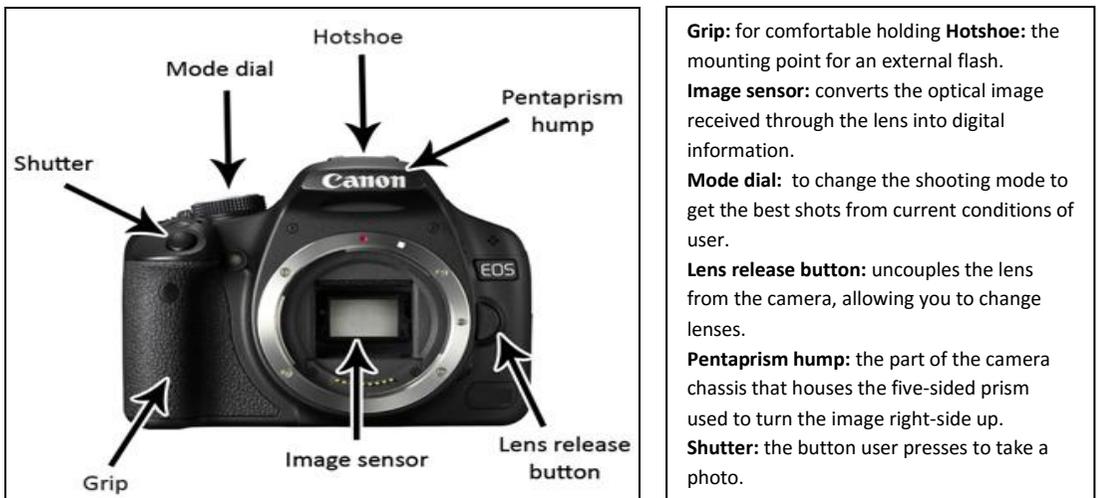
Photography is best option for the professional of KVKs in order to take photographs related to their work. These photographs will help in documentation of scientific practices, experiments, observations, results etc. Photography is the science, art and practice of creating durable images by recording light or other electromagnetic radiation, either electronically by means of an image sensor, or chemically by means of a light-sensitive material such as photographic film. In earlier days photography was very costly hobby and profession due to use of photographic films. But now a day’s photographs are recorded digitally in memory a cards which makes photography very easy. The handling, recording, storage and retrieving of images has become very user friendly and anyone can shoot photographs.

In this publication, our objective is not to convert researchers into photographers but to enable them to take good quality photographs to boost the process of science documentation and information sharing. As most of our KVK professionals are working in remote areas with limited resources it is not possible for them to hire professional photographers to take photographs in field. Therefore, with little bit technical understanding and regular practice of photography will help them to shoot the scientifically worth images at right time and right place. This practice will greatly help KVK professionals for the documentation of scientific and technical activities as well as to create good quality reports, proceedings, popular articles, books, posters, leaflets, folders, technical bulletins etc. for peers and farmers.

As soon as we say the word photography, another word pops up in mind is ‘Camera’. So, what is camera?

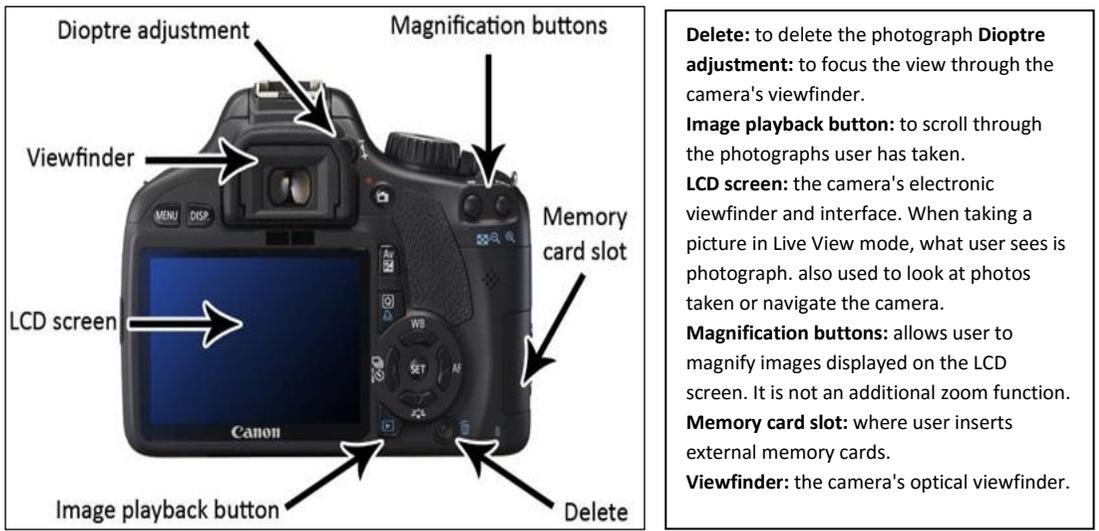
Camera is an optical instrument that records images. It is a device for recording visual images in the form of photographs, film, or video signals. The functioning of the camera is very similar to the functioning of the human eye. Camera captures images by collecting light that is reflected off an object and then creating a copy of the image on storage device. The term camera comes from the word camera *obscura* a Latin word for "dark chamber" which were used in early days for projecting images.

The basic parts of camera are shown in the figure depicted below.



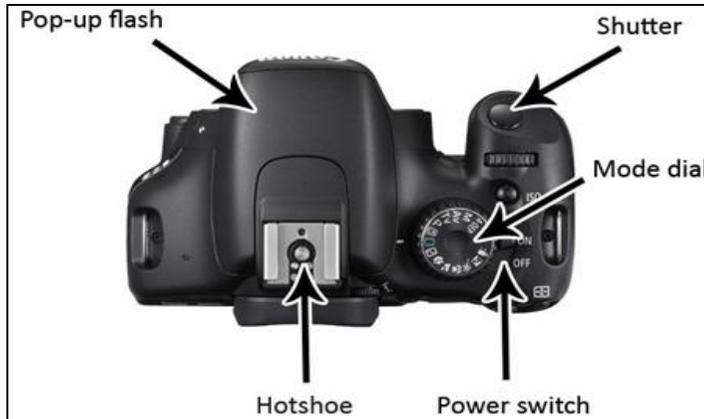
Grip: for comfortable holding **Hotshoe:** the mounting point for an external flash.
Image sensor: converts the optical image received through the lens into digital information.
Mode dial: to change the shooting mode to get the best shots from current conditions of user.
Lens release button: uncouples the lens from the camera, allowing you to change lenses.
Pentaprism hump: the part of the camera chassis that houses the five-sided prism used to turn the image right-side up.
Shutter: the button user presses to take a photo.

Fig. 1.1: Front view of DSLR Camera without lens and functions of various parts/buttons



Delete: to delete the photograph **Dioptr adjustment:** to focus the view through the camera's viewfinder.
Image playback button: to scroll through the photographs user has taken.
LCD screen: the camera's electronic viewfinder and interface. When taking a picture in Live View mode, what user sees is photograph. also used to look at photos taken or navigate the camera.
Magnification buttons: allows user to magnify images displayed on the LCD screen. It is not an additional zoom function.
Memory card slot: where user inserts external memory cards.
Viewfinder: the camera's optical viewfinder.

Fig. 1.2: Back side view of DSLR Camera and functions of various parts/buttons



Hotshoe: the mounting point for an external flash.
Mode dial: allows user to change the shooting mode to get the best shots from your current conditions.
Pop-up flash: The cameras' internal flash, which pops up so it can be hidden when not in use.
Power switch: turns the camera on and off.
Shutter: the button user presses to take a photo.

Fig. 1.3: Top view of DSLR Camera and functions of various parts/buttons

The above mentioned figures are showing the parts of digital SLR (DSLR: Digital single-lens reflex) camera. This type of cameras are little difficult to use but yields excellent results if used with training and practice. Many households and KVK professionals have their personal digital cameras which are relatively easy to use.

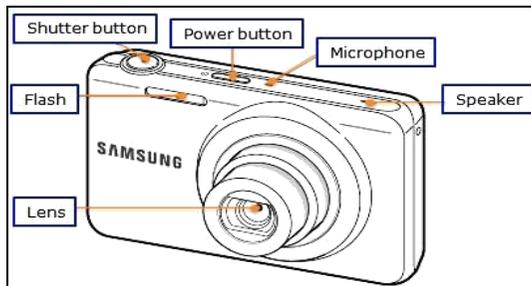
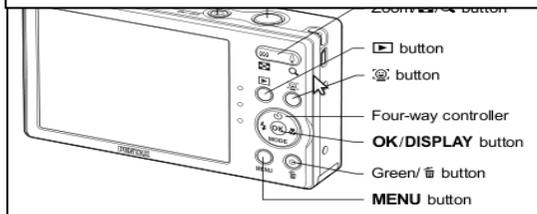


Fig. 1.4: Front and rear view of digital Camera and functions of various parts/buttons



The digital cameras are handy, easy to use and good for short range photography. The price is also comparatively low than DSLR camera. But to use any camera and to shoot professional quality pictures there are certain tips to be

followed with an understanding of certain basics of photography. Those concepts and tips are explained below.



Fig. 1.5: Various type of Lenses used in DSLR cameras by professional photographers



Exposure: it is the act of exposing the image sensor to light. User can increase or decrease the brightness of image by adjusting the amount of light. Generally, digital Cameras have auto-exposure systems that automatically produce photographs of optimal brightness. For the excellent images user must archive as optimal exposure which means image should neither be too dark nor too bright. (Digital SLR Camera Basics, 2014)

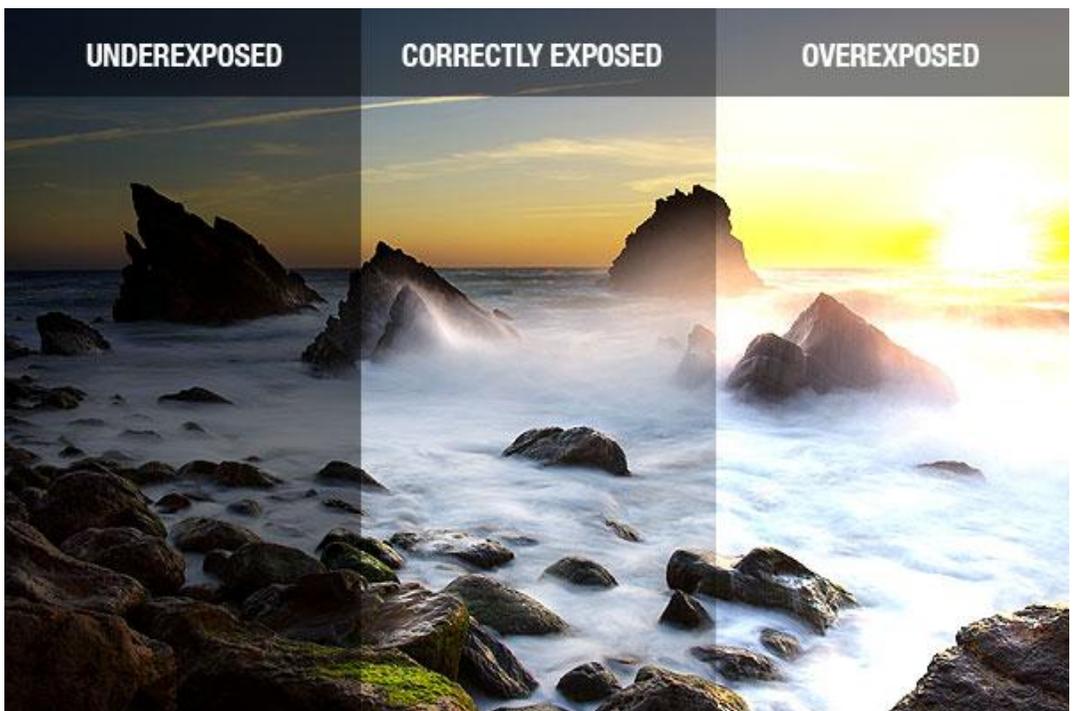


Fig. 1.6: Comparison of under exposed, correctly exposed and over exposed image
(Source: <http://fullframeproductions.com.au/aperture-f-stop-means/>)

Aperture: Aperture controls the brightness of the photograph that passes through the lens and falls on the image sensor. Aperture is shown by f-number for example- $f/1.4$, $f/2$, $f/2.8$, $f/4$, $f/5.6$, $f/8$, $f/11$, $f/16$, $f/22$, or $f/32$. In simple words, aperture controls the amount of light that goes to sensor via lens. This implies that;

If “ f ” number is more, then SMALLER APERTURE= less amount of light goes through lens & “ f ” number is less, then LARGER APERTURE= More amount of light goes through lens

Aperture also manipulates the depth of field of an image. The distance in front of and behind the focus point that appears to be in focus is called as ‘depth of field’. If ‘ f ’ number is higher, then greater depth of field and if ‘ f ’ number is smaller, then lower depth of field can be achieved. (Digital SLR Camera Basics, 2014)

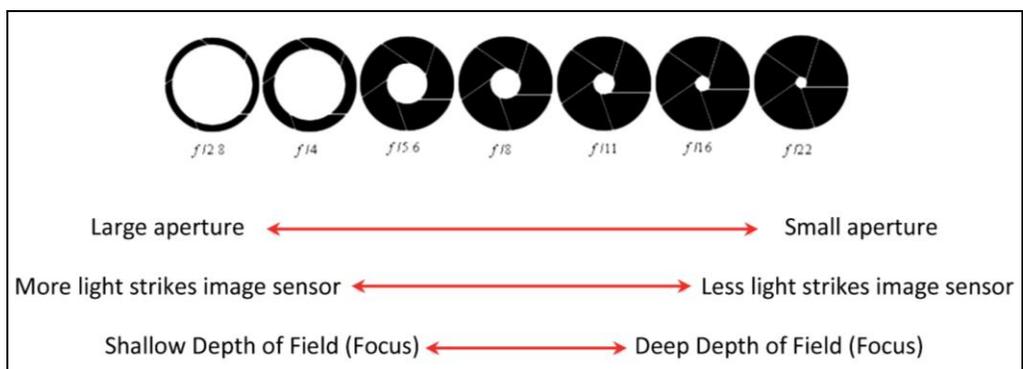


Fig. 1.7: Aperture Scale showing results of various settings

(Source: <http://blog.cameralends.com/category/creative-photography-ideas/photography-project-ideas/page/2/>)

Shutter Speed: Shutter speed is a measurement of the time the shutter of camera is open. This is measured in seconds or fractions of a second: 1 s, $1/2$ s, $1/4$ s ... $1/250$ s, $1/500$ s, etc. Shutter speed is like how much time user opens the window for entry of light. (Digital SLR Camera Basics, 2014). To simply please remember that;

FAST SHUTTER SPEED = Image sensor will be exposed to light for shorter time &
SLOW SHUTTER SPEED = Image sensor will be exposed to light for longer time.

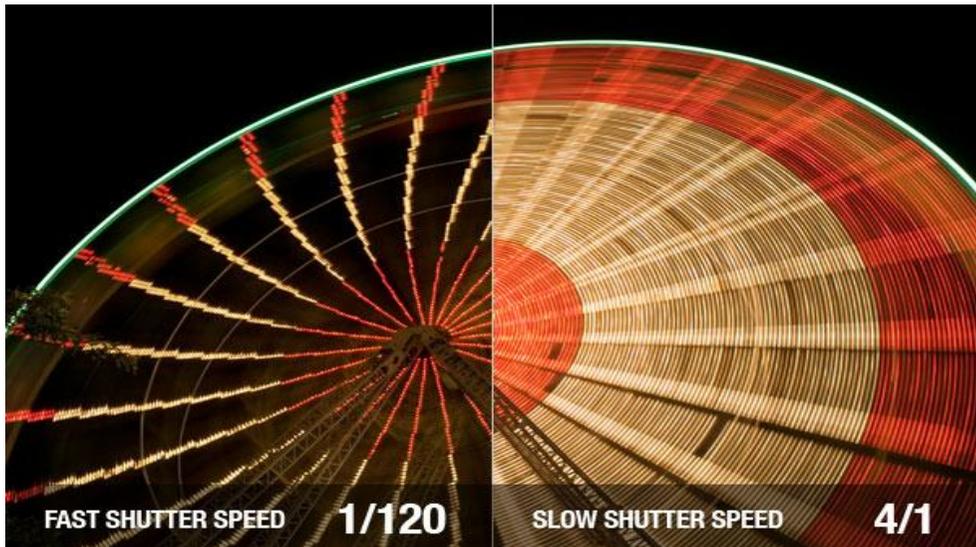


Fig. 1.8: Effects of Faster and slow shutter speed on Image

(Source: <http://vclick.photography/for-beginners/understanding-shutter-speed/>)

It implies that; to shoot the moving objects fast shutter speed must be used to freeze the images whereas slow shutter speed will give blur effect to photograph.

ISO Sensitivity: In the case of digital cameras, ISO sensitivity is an extent of the camera's ability to capture light. Digital cameras convert the light that falls on the image sensor into electrical signals for processing. User can increase the ISO sensitivity by amplifying the signal. It means enhancing ISO sensitivity increases the electrical signal to achieve optimal exposure. (Digital SLR Camera Basics, 2014)

To simply please remember that;

Low light + fast shutter speed + low ISO= blur images &

Low Light + fast shutter speed + High ISO= relatively less blur & clear image.

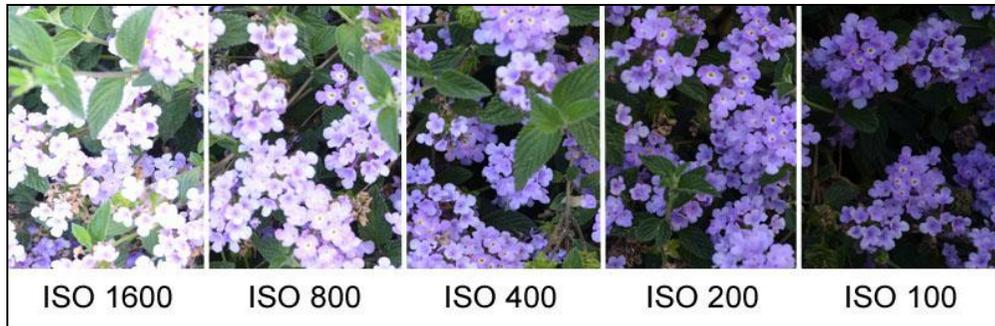


Fig. 1.9: Effects of Higher and Lower ISO on Image exposure

(Source: <http://www.nobadfoto.com/understanding-exposure-4.html>)

If light is good then it is better to keep ISO at 100. Users can choose auto mode so that camera will automatically decide perfect ISO for image in particular situation.

How to hold the camera?

‘Camera shake’ is the major problem faced by many photographers which results into blurred and fuzzy images. To avoid this problem, one must consider holding camera tightly to avoid any movement and keep camera as steady as possible. There are certain tips to it as follows. (Rowse, 2006-2014)

- Hold the camera tightly with right hand precisely as per the design of grip.
- Practice the movement of forefinger only while clicking the shutter button.
- Use the left hand to support the camera and lenses from underneath.
- Keep the elbows close to body (Chest) and as firm as possible.
- Keep some distance in between two legs it gives more stability.
- Keep the camera’s grid lines parallel to horizon or any straight line.
- In case of small digital camera also use both hands to take photograph.
- Breathe slowly while focusing and you can stop breathing for second while shooting an image. It is as serious as shooting with sniper rifle.
- Use stable support like wall, pillar, table, stool to give stability to camera of possible. For some photographs you can camera on ground also.
- Use of tripod is the best way to remove the camera shake problem.

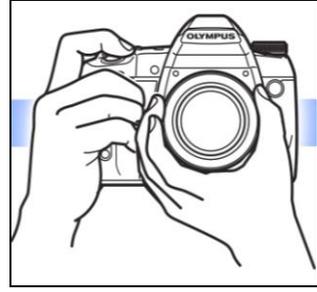


Fig. 1.10: Correct postures and hand positions to take steady photographs



The basic shots in still photography:

Extreme Long Shot (ELS): it is a shot in which subject is not clearly visible. It is generally taken from very long distance. It shows the widened of image i.e. extent of spread. Ex. Picture of city from tower or picture of entire university building.

Very Long Shot: In this shot subject is barely visible. It emphasises mainly the environment of a subject. Ex. Picture of division in university with student

Long Shot-Wide Shot: it is a shot in which the subject takes up the full frame. Head room and look room is also comfortably provided in shot. Some extra space can also be provided at top and bottom also. Ex. Student is in standing position and around him some portion of walls of university building and windows are appearing.

Mid Shot: The mid shot shows some part of the subject in more detail. This is an approximation of how you would see a person "in the flesh" if you were having a casual conversation. You wouldn't be paying any attention to their lower body, so that part of the picture is unnecessary. Ex. Student's picture above his belt.

Medium Closeup: The medium closeup is half way between a mid-shot and a close up. This shot shows the face more clearly, without getting uncomfortably

close.

Ex. Picture of student above the Shirt pocket (chest).



Fig. 1.11: Various types of photo shots in outdoor photography

(Source: <http://t.bzi.ro/sfaturi-pentru-cele-mai-bune-selfie-uri-ce-sa-faci-si-ce-sa-nu-faci-atunci-cand-te-pozezi-singur-13534>)

Closeup: In the closeup shot, a certain feature or part of the subject takes up most of the frame. A close up of a person usually means a close up of their face. Close-ups are obviously useful for showing detail. A close-up of a person emphasizes their emotional state. Whereas a mid-shot or wide-shot is more appropriate for delivering facts and general information, a close-up exaggerates facial expressions which convey emotion. The viewer is drawn into the subject's personal space and shares their feelings. Ex. Photograph taken of students' face with headroom.

Extreme Closeup: This shot gets right in and shows extreme detail. Photographer normally needs a specific reason to get this close. It is too close to show general reactions or emotion except in very dramatic scenes. Ex. Photograph of students' face without headroom and one can clearly see the pimples on her face.

User/photographer must use the appropriate shot while framing the object. The **Framing is the technique of drawing attention to the subject** of your image by blocking other parts of the image with something in the scene. It means what exactly you want to show in the photograph and its environment.

Framing gives context to picture and also provides information about its environment. The good frame must draw the attention of viewer towards main

focal point of subject. The frame must be attractive and catch the attention of the viewer. Therefore, in other words, Framing is simply using other objects in your photograph to frame the main subject. Some time blurred background in frame makes subject sharper and frame becomes catchy. So it's all about the creativity of photographer about what he/she wants to show in photograph.

Focusing camera:

Due to the optical properties of photographic lenses, only objects within a limited range of distances from the camera will be reproduced clearly. The process of adjusting this range is known as changing the camera's focus. There are various ways of focusing a camera accurately. The simplest cameras have fixed focus and use a small aperture and wide-angle lens to ensure that everything within a certain range of distance from the lens, usually around 3 metres (10 ft) to infinity, is in reasonable focus. Single-lens reflex cameras allow the photographer to determine the focus and composition visually using the objective lens and a moving mirror to project the image onto a ground glass or plastic micro-prism screen. Modern cameras often offer autofocus systems to focus the camera automatically by a variety of methods.

Modes of shooting photograph:

The modes of photography are generally divided as automatic mode, semi automatic mode and fully manual mode. They are explained here one by one as following.

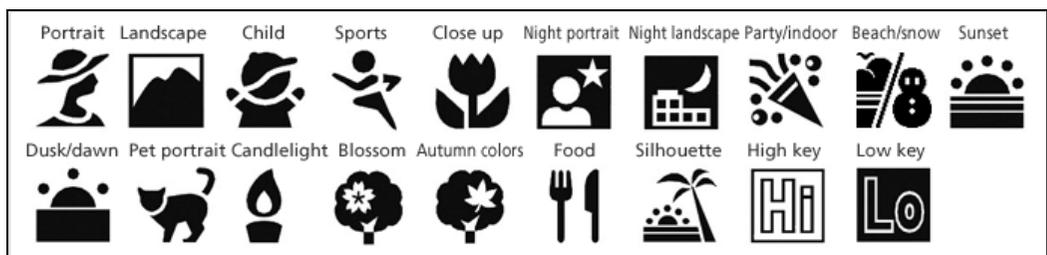


Fig. 1.12: Various types of AUTOMATIC photography modes of digital cameras

Automatic Modes

- **Portrait Mode:** Camera automatically selects a large aperture (small number) which helps to keep your background out of focus. It sets a narrow depth of field – ensuring your subject is the only thing in focus

and is therefore the centre of attention in the shot. Portrait mode works best while photographing a single subject so get in close enough to your subject (either by zooming in or walking closer) so that your photographing the head and shoulders of them).

- **Macro Mode:** Go closer to your subject to take a close up picture. It's great for shooting flowers, insects or other small objects. In macro mode focussing is more difficult. Keep camera and the object parallel if possible or else it will be out of focus. Use of flash is not recommended to take extreme close up shots.
- **Landscape Mode:** This mode is almost the exact opposite of portrait mode. Landscape mode sets small aperture (large number) to make sure that most of the scene will be in focus as possible. This mode gives a large depth of field which makes it ideal for capturing shots of wide scenes, particularly those with points of interest at different distances from the camera. Use of tripod yields better results in landscape mode.
- **Sports Mode:** sports mode is designed for photographing moving objects. It is ideal for photographing any moving objects including people playing sports, pets, cars, wildlife etc. Sports mode attempts to freeze the action by increasing the shutter speed. Panning camera with this mode gives excellent images.
- **Night Mode:** Night mode is for shooting in low light situations. It sets your camera to use a longer shutter speed to help capture details of the background but it also fires off a flash to illuminate the foreground and subject. If you use this mode for a 'serious' or well balanced shot use of a tripod is recommended.
- **Movie Mode:** This mode extends digital camera to capture moving pictures. Most new digital cameras these days come with a movie mode that records both video but also sound. The quality is generally not up to video camera standards but it's a handy mode. Shooting in movie mode

VARIOUS SHOOTING MODES OF DIGITAL CAMERAS

Panoramic Mode – for taking shots of a panoramic scene to be joined together later as one image.

Snow Mode – to help with tricky bright lighting at the snow

Fireworks Mode - for shooting firework displays

Kids and Pets Mode – fast moving objects can be tricky – this mode seems to speed up shutter speed and help reduce shutter lag with some pre focussing

Underwater Mode – underwater photography has its own unique set of exposure requirements

Beach Mode – another bright scene mode

Indoor Mode – helps with setting shutter speed and white balance

Foliage Mode - boosts saturation to give nice bold colours

take up significantly more space on your memory storage than still images.

Semi-Automatic Modes

- **Aperture Priority Mode (A or AV):** This mode allows choosing the aperture and where your camera decides the other settings like shutter speed, white balance, ISO etc. so as to ensure you have a well balanced exposure. Aperture priority mode is useful to control the depth of field in a shot.
- **Shutter Priority Mode (S or TV):** The mode where you select a shutter speed and the camera then chooses all of the other settings. Use this mode to control shutter speed (obviously). Choose a slow shutter speed in lower light situations.
- **Program Mode (P):** Some digital cameras have this priority mode which gives a little more control over some other features including flash, white balance, ISO etc.



Fig. 1.13: Various basic and advanced photography modes of DSLR cameras

Fully Manual Mode:

In this mode user have full control over camera and need to think about all settings including shutter speed, aperture, ISO, white balance, flash etc. It gives you the flexibility to set your shots up as users wish. (Digital Camera Modes, 2014)

How to take photographs: Tips for taking good photographs

- Make sure that your camera is in good working condition; battery is enough and ensure enough space in memory card.
- Think for your shot and decide the frame i.e. what you want to show = what you see through the viewfinder of camera.
- Choose the appropriate mode for photograph as per need of situation
- Ensure that camera is positioned against the source of light i.e. subject is well exposed to light.
- Try to hold camera firmly or install it on tripod.
- Use your creativity to arrange the subject and compose the image.
- It is good to maintain symmetry in official photographs.
- Once camera is placed, then start focusing the image by zooming in or zooming out whichever is necessary. Always go for the optical zoom, digital zoom is not applicable for all conditions.
- To focus the camera, gently half press the shutter button and wait for some time till the camera makes the beep sound. This beep sound is also coupled with turning of focus square into green from gray/white colour.

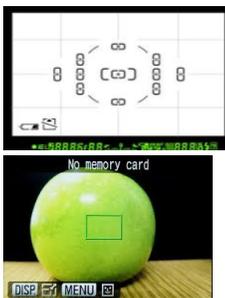


Fig. 1.15: UnFOCUSED camera screen



Fig. 1.16: FOCUSED camera screen

- Once focusing is complete, then press the shutter button completely. It will record the image on the memory card.
- See the images on LCD screen and if you are not satisfied with it then go for more shots. If possible make necessary changes in the settings of camera.

Transfer all the images to computer/laptop to store them for further uses. Some time you may need to do some after processing of image. Edit the image in programme like Google's Picasa. Crop the necessary part and save the image. If necessary one can also do the changes in brightness, contrast etc. If it is an image of great importance, then you can also put text claiming your copy right on image.

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