Photography Workshop

Notes

Abhishek Bohare

a_bohare@icloud.com

typeset with LaTeX

Contents

1 Photography Workshop: Introduction to Composition **1**

1.1 Introduction and background 1

1.1.1 Course structure 1

1.2 Basic photography 2

1.2.1 How a DSLR works 2

1.2.2 Depth of field 2

1.2.3 Shutter speed and movement 2

1.2.4 Getting started 3

1.2.5 Holding the camera 3

1.2.6 Settings to set first 3

1.3 Composition 3

1.3.1 1. Horizontal horizons 3

1.3.2 2. Rule of thirds 4

1.3.3 3. Framing 4

1.3.4 4. Check your background 4

1.3.5 5. Fill the frame 4

1.3.6 6. Leading lines 4

1.3.7 7. Eye level 4

1.3.8 8. Look for details 5

1.3.9 9. Take vertical photos too 5

1.3.10 10. Break the rules 5

1.4 Exposure 5

1.4.1 Metering modes 5

1.4.2 Exposure compensation 5

1.4.3 Histogram 6

1.5 Aperture and depth of field 6

1.6 Shutter speed and movement 7

1.7 ISO 7

1.7.1 Exposure triangle and modes 8

2 Lighting, Lenses and Astrophotography 9

2.1 Lighting 9

2.2 Lenses 9

2.3 Practical photography 10

2.3.1 Rick Sammon photography 10

2.3.2 Josh Katz: astrophotography 11

2.3.3 Pixelvillage 11

2.4 Astrophotography 11

2.4.1 Equipment 11

2.4.2 Portrait settings 12

2.4.3 Settings from the notes 12

2.4.4 Planning 12

2.4.5 Twilight 12

2.4.6 Moon phases 13

2.4.7 Checklist 13

2.4.8 Advanced techniques to lower noise 13

Todo list

The notes are a student's summary and contain no references. A few statements are loose, or differ from standard photography practice. They are flagged in the margin, and the notes' own wording is kept. . 1

The sketch is redrawn from the scan and is schematic. The notebook labels the red box "Pentaprism", the diagonal line "Mirror", and the vertical pair "Shutter" and "Sensor". 2

"Set diafters" on page 7 is read as *dioptre*, the adjustment on the viewfinder eyepiece for the photographer's eyesight. 3

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Focal length is the distance from the lens (its optical centre) to the point where parallel rays come to a focus, as in the notes' three sketches. It is not a measure of the light being focused *on* the lens. 9

"70 and 300 mm" as examples of prime lenses looks like a slip: 70–300 mm is a telephoto *zoom*. Common primes are 35, 50 and 85 mm. 10

In Canon naming, EF is "electro-focus" and USM is "ultrasonic motor" (a fast, quiet autofocus drive). The notes' "auto-focus speed" is a loose description of USM. "L" marks Canon's professional "luxury" series. . 10

The notes write "Josh Kartz". The "higher shutter speed" item seems out of place for astrophotography, which normally uses *long* exposures; the note on star trails later in the notebook agrees (10 to 45 s). 11

The entry "48 MP $f/1.2$, 5 MP $f/5.2$" has no explanation in the notes. It seems to compare two cameras or phones. It is kept as written. . . 11

ISO 25600 with 0.8 s and $f/2$ is a very high-sensitivity night setting; the notes label it "portraits settings" with a circled 1, probably a night portrait. Check the original context. 12

The best months for the Milky Way core depend on latitude and hemisphere (roughly March to October for the northern hemisphere). The notes' "mid-March to mid-November" is as written. 12

1 Photography Workshop: Introduction to Composition

These notes come from a handwritten notebook dated 2 February 2020, taken during an online photography course. The tutor is Chris Bray from Australia, and the course follows his *Photography Course Notes handbook* and *cheat cards*. The notebook has ten course sections, followed by notes from other photographers (Rick Sammon, Josh Katz on astrophotography, Pixelvillage) and a long section on astrophotography settings. The red pen in the notebook marks key points; here they are in the text without colour.

The notes are a student's summary and contain no references. A few statements are loose, or differ from standard photography practice. They are flagged in the margin, and the notes' own wording is kept.

1.1 Introduction and background

- Tutor: Chris Bray, from Australia.
- No one is born with any photographic talent. The more you practise, the more you learn. There is hope for everyone.
- Enjoy your passion. It is an adventure.
- Book: *The 1000 Hour Day* (buy online at chrisbrayphotography.com).
- "An amazing tale of real adventure and genuine exploration in the modern era." (Dick Smith, quoted on the book.)
- Documentary: *The Crossing*.
- No formal training needed.
- Strange and exciting.

1.1.1 Course structure

1. Introduction and background
2. Basic photography
3. Composition
4. Exposure
5. Aperture and depth of field
6. Shutter speed and movement
7. ISO
8. Lighting
9. Lenses
10. Practical photography

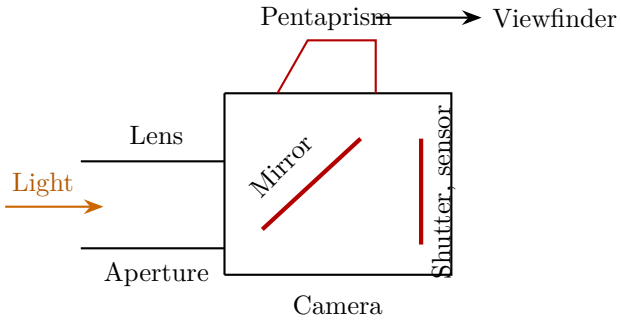
1.2 Basic photography

Kinds of camera: compact camera, DSLR, smartphone, bridge camera, mirrorless camera, macro.

> The best camera is the one which you have. You can click best photos using a mobile also.

1.2.1 How a DSLR works

Light enters through the lens and the aperture and reaches the mirror, which reflects it up through the pentaprism to the viewfinder. When a photo is taken the mirror flips up, the shutter opens, and the light falls on the sensor.



The sketch is redrawn from the scan and is schematic. The notebook labels the red box “Pentaprism”, the diagonal line “Mirror”, and the vertical pair “Shutter” and “Sensor”.

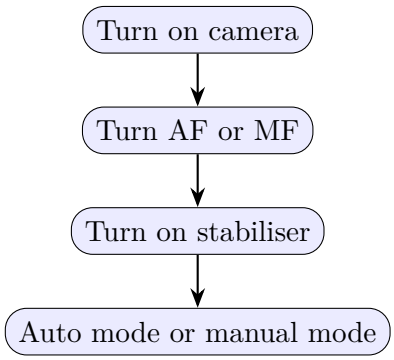
1.2.2 Depth of field

Aperture affects the depth of field (DoF): small DoF or big DoF (see the section on aperture and depth of field below). In Auto mode the camera does not know which type of photo you are clicking.

1.2.3 Shutter speed and movement

- Fast movement $\propto$ fast shutter speed.
- Slow movement $\propto$ slow shutter speed.

1.2.4 Getting started



1.2.5 Holding the camera

- Hold the camera steady.
- Hold the camera with the right hand and put the left hand under the lens, which in turn handles the lens.
- Elbows in (for horizontal shots).
- Grip on top (for vertical shots).
- Squeeze the buttons.

1.2.6 Settings to set first

- **P**: Program mode.
- Always set the quality of photos.
- Set the AF mode: single focus (AF-S) ✓, or tracking focus (AI-Servo/AF-C).
- Set the dioptre in the camera (the eyepiece adjustment).

Summary. P mode (or better); auto focus (AF); stabilising on; high resolution, fine quality; AF mode (1-shot/AF-S); centre AF point.

"Great photos are made, not taken." (Author unknown)

"Set diafters" on page 7 is read as *dioptre*, the adjustment on the viewfinder eyepiece for the photographer's eyesight.

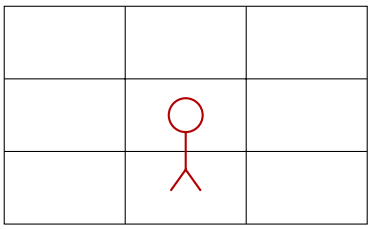
1.3 Composition

1.3.1 1. Horizontal horizons

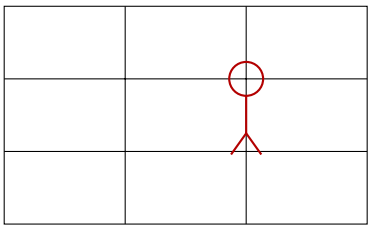
Hold the camera straight (0°).

1.3.2 2. Rule of thirds

Divide the frame into a 3×3 grid. Place the subject on a line or an intersection rather than in the centre. Give subjects room to move into and see into.



centred



on a thirds intersection

- First focus the subject in the middle of the camera, then move the camera right and click.
- Focus the eyes of the subject.
- Symmetric conditions sometimes.
- The world does not fit in your camera. Good composition beats trying to fit everything.

1.3.3 3. Framing

Framing gives a 3D look and includes things in the foreground.

1.3.4 4. Check your background

- Human eyes always check the background.
- Include more colours.
- Check for a clean and contrasty background.

1.3.5 5. Fill the frame

Crop the best part for more detail.

1.3.6 6. Leading lines

Check what is interesting there, zoom and click. There is no need to fit everything. Make sure lines come to the corner.

1.3.7 7. Eye level

Change the angle of your eye. Get at the same level as your subject for a strong connection with the subject.

1.3.8 8. Look for details

It is easy to check details. Always focus and click.

1.3.9 9. Take vertical photos too

Always take a vertical photo of every photo which is taken horizontally.

1.3.10 10. Break the rules

Sometimes break the rules of photography. Feel free.

1.4 Exposure

- Too light: overexposure. Too dark: underexposure.
- Exposure is the light falling on the sensor of the camera. The right amount of light gives the correct exposure.
- Camera problem: contrast limitation. Use HDR mode. The camera cannot record the whole range that the eye sees (the "mental picture").
- The aperture hole (opening) changes with the light; a different aperture needs a different shutter speed, giving a different result ("different trick").

- Shutter-speed limit: 1/4000 to 60 s. Aperture limit: 0 to 100 or auto.
- Take a mid-shot of the scene.

The note "Do not take photos in afternoon" conflicts with the lighting section later, where the golden hours include 3 to 5 pm and the "harsh hours" are 11 am to 2 pm. The intended meaning is probably "avoid the harsh light around midday".

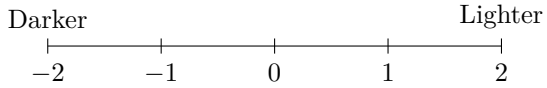
The aperture limit "0 to 100 or Auto" is not an f-number range. The notes probably mean the *exposure* or an on-screen scale. Kept as written.

1.4.1 Metering modes

1. Centre-weighted
2. Frame average
3. Spot metering

Use centre-weighted or matrix metering. Use frame metering for the evening. Use spot metering for the afternoon. The camera's menu also lists evaluative (matrix), partial, spot and others; the notes say the last ones are "not very useful", and recommend matrix mode.

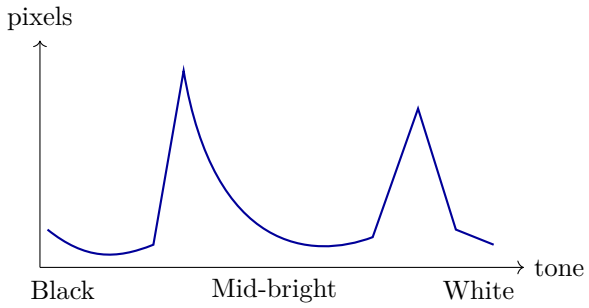
1.4.2 Exposure compensation



Check photos after clicking. Click a photo, check the histogram and edit too: click a bright photo at +2, a photo at 0, and a dark photo at −1 or −2, and check the histogram of each.

1.4.3 Histogram

The histogram plots the number of pixels (none, some, lots) against tone from black through mid-bright to white. Spikes at the ends show lost detail in the blacks or the whites.



The histogram is redrawn schematically from the scan; the original shows spikes at the left and right ends and a dip in the middle.

Check the graph and check again after editing. Change the histogram details and edit. Use review mode.

1.5 Aperture and depth of field

Aperture controls the depth of field.

- Small DoF: blur in the background (small depth of field).
- Big DoF: no blur in the background (big depth of field).
- If the whole image is blurred, it is an error (clean the glass).

The f-numbers run $f/11$, $f/8$, $f/5.6$, $f/4$, $f/2.8$, $f/2$. A larger aperture leads to a smaller $f/\#$.

Depth of field	**Aperture**	$f/\#$
Small (background blur)	large	small
Large (background not blurred)	small	large

- Portrait mode (face icon), landscape mode (mountain icon), sports/fast clicking (running figure).
- **Av(A):** just choose the aperture value and the camera picks the shutter speed.
- A large $f/\#$ can result in a slow shutter speed. A small $f/\#$ can result in a fast shutter speed. Use a tripod for slow shutter speeds.

- DoF does not change in the viewfinder. Check for warnings.
- *Practical session:* click photos for small DoF, click photos for large DoF, and blur a portrait image.

1.6 Shutter speed and movement

How long the shutter is open for light is called shutter speed.

- For a moving object, use a fast shutter speed. For a static object, use a slow shutter speed.
- For low light, use a slow shutter speed. For high light, use a fast shutter speed.
- To click photos of stars, use a slow shutter speed. Use a tripod. Turn the stabiliser off when you use a tripod.

Drive modes: one shot; continuous shot; remote control (10 s); 2 s self-timer; self-timer continuous mode.

Tv(S): choose the shutter speed yourself; the camera will decide the aperture for it. Shutter speed is most important when you want to freeze movement, pan with an object or zoom. *Practical session:* click photos of moving objects.

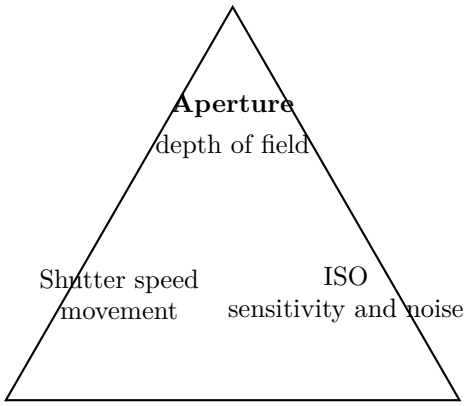
1.7 ISO

ISO is a variable setting: sensitivity. The range runs from ISO 100 to ISO 6400.

Setting	**Effect**
Higher ISO	more sensitive → faster shutter speed
Lower ISO	less sensitive → slower shutter speeds
High ISO	noise

Keep ISO between 100 and 800 for inexpensive cameras.

1.7.1 Exposure triangle and modes



M: manual mode (pick everything manually)

- **M** is manual mode. **B** is bulb mode: shutter control.
- *Practical session:* click photos at lower ISO and at higher ISO.
- **Auto ISO:** T ✓ (with Tv); A × (with Av).

The notebook draws three triangles within one another, labelled *Aperture/depth of field*, *shutter speed/movement*, *ISO/-sensitivity and noise*, with the outer one labelled "M: manual mode, pick everything manually". The drawing here is a simplified version.

"T ✓, A ×" next to Auto ISO is read as Auto ISO working with Tv and not with Av. The meaning is not explained in the notes.

2 Lighting, Lenses and Astrophotography

2.1 Lighting

Lighting is the most important part of photography.

Time	Notes
Golden hours	8:00 am to 10:00 am; 3:00 pm to 5:00 pm
Harsh hours	11:00 am to 2:00 pm
Cloudy time	also a good time to click
Low-light hours	tricky time: high shutter speed, ISO up (the notes show both arrows) aperture $f/\#$ high

The notes give fixed clock times. The golden hour depends on the season and place; it is the hour after sunrise and before sunset. The notes' times are probably the instructor's local examples. Also, in low light a *low* $f/\#$ (wide aperture) lets in more light; "$f/\#$ High" may mean the aperture is "high" (wide) rather than the number.

- Front light (light from behind the photographer onto the subject): good for objects. Side lights are good for portraits.
- Use lens hoods. Think about lighting. Use HDR mode too. Check the direction of the lighting.
- Do not use flash in the morning.

"Do not use flash in the morning" is written without an explanation. Fill flash is in fact often useful in bright morning sun to lift shadows. Kept as written.

Kinds of light: external light, bulb, LED.

White balance: A.W.B. is auto white balance; custom white balance is the manual mode.

Filters. Use polarising filters (of good quality). Use UV filters. Do not use UV filters on modern cameras.

The notes say to use UV filters and also not to use UV filters on modern cameras. The usual advice is that UV filters are mainly protection for the front lens element, because modern sensors already block UV; the notes keep both statements.

2.2 Lenses

Standard lens. As we look from our eyes, it clicks the same photos.

Wide-angle lens. Fits more and more stuff.

Telephoto lens. Like telescopes, zooms more and more.

Macro lens. Close-ups of small things such as a mosquito or rain drops.

Fisheye lens. Clicks 180° photos.

Focal length. The notes say it measures how the light is focused on the lens, and draw three lenses of 20 mm, 50 mm and 150 mm.

Focal length is the distance from the lens (its optical centre) to the point where parallel rays come to a focus, as in the notes' three sketches. It is not a measure of the light being focused *on* the lens.

Lens	Type
50 mm	standard lens
< 50 mm	wide-angle lens
> 50 mm	telephoto lens

- **Shutter speed rule.** A 50 mm lens: 1/50 s; a 500 mm lens: 1/500 s. The shutter speed should be about $1/f$.
- 24–105 mm is a versatile lens. 100–400 mm is a telephoto lens (wildlife).
- **Prime lenses** have one focal length. The notes write "70 and 300 mm", and say prime lenses give the best quality.
- **Lens speed.** A small $f/\#$ means a fast lens speed.

"70 and 300 mm" as examples of prime lenses looks like a slip: 70–300 mm is a telephoto *zoom*. Common primes are 35, 50 and 85 mm.

Lens code (Canon). For a lens named "EF 24–105 mm 1:4": EF is electro-focus, 24–105 mm is the range, and 1:4 is the speed of the lens (the maximum aperture, $f/4$).

Letters	Meaning in the notes
L	more professional
IS	image stabilise
USM	auto-focus speed
MF	manual focus
AF	auto focus (more accurate)

In Canon naming, EF is "electro-focus" and USM is "ultrasonic motor" (a fast, quiet autofocus drive). The notes' "auto-focus speed" is a loose description of USM. "L" marks Canon's professional "luxury" series.

2.3 Practical photography

- Keep your camera clean (sensor cleaning too). Pose.
- "Take lots, delete later" is marked with a cross: you run out of battery, the memory card fills, and you delete the wrong photo. **Take fewer but better.**
- Keep good-brand cards and hard drives.
- Post-production: Adobe Lightroom (Lr), Picasa.
- Email magazines. Go outside the comfort zone. You can click RAW files.

2.3.1 Rick Sammon photography

- The best thing about clicking a picture is the mood. Let us explore life.
- Contrast range? Start with light.
- See the directions of the light. Control the light.

- Quality of light: before sunrise or after sunset. Colour of light. Intensity of light.
- Sharp and selective (the word “globally” is struck out). Colour filters for black-and-white photography.
- Envision the end result.

2.3.2 Josh Katz: astrophotography

Most dark places; Skyguide; right location; composition; 10 mm lens; higher shutter speed; $f/3.5$; ISO 3200 or 1600. Clean your lens or camera.

The notes write “Josh Kartz”. The “higher shutter speed” item seems out of place for astrophotography, which normally uses *long* exposures; the note on star trails later in the notebook agrees (10 to 45 s).

2.3.3 Pixelvillage

- Check the way of falling light on texture: click from the side that the light falls from for more 3D.
- Always check the lights. Even in low light, keep ISO as low as you can. Increase the shutter speed gradually when clicking in low-light conditions.
- 48 MP, $f/1.2$; 5 MP, $f/5.2$ (as written).
- Always make the sun behind. Turn on grid lines (on your screen; the notes strike out “side” and write “grids”).
- Symmetric conditions. Practise a lot. For symmetric shots the distance D on each side of the centre line is equal.
- Check perfect lights. The light should be in front of you when clicking macro photography. Use a macro lens. Use HDR mode.
- Use the nearest part or point of the body when using camera portraits. Tap your screen for focus always.
- The closer the subject is to the camera, the more blur effect in this situation (the background blurs more).

The entry “48 MP $f/1.2$, 5 MP $f/5.2$” has no explanation in the notes. It seems to compare two cameras or phones. It is kept as written.

2.4 Astrophotography

2.4.1 Equipment

Sony A7 III for photography (the notes write “A73”); lens: Canon 35 mm $f/1.4$ Mark II; other lens: Sony 28 mm. A tripod is necessary.

Test	Settings	Note
Trial	ISO 1000; shutter 10 s	
Click 1	exposure +1; ISO 1000; shutter 10 s	
Click 2	shutter 10 s; $f/3.5$; ISO 1000	
Click 3	shutter 15 s; $f/3.5$; ISO 1600	

Check manual focus. Check the lens ring to zoom a little bit. Edit photos a little bit. Increase your exposure sometimes. Click some photos at a lower aperture. Just play more with shutter speed and ISO.

Click at shutter speeds of: 5, 7, 10, 15, 20, 25, 30, 35, 40, 45 seconds.

2.4.2 Portrait settings

Shutter 0.8 s; $f/2$; ISO 25600.

ISO 25600 with 0.8 s and $f/2$ is a very high-sensitivity night setting; the notes label it "portraits settings" with a circled 1, probably a night portrait. Check the original context.

2.4.3 Settings from the notes

Camera or lens	Shutter	ISO	Aperture	Note
D800, 14 mm	20 s	4000	$f/3.5$	click some photos
	30 s	1600	$f/3.5$	
	13 s	5000	$f/3.2$	
	30 s	3200	$f/2.8$	
Most common settings (14 mm wide-angle lens)	25 s	4000	$f/2.8$	

Move your focus to infinity (∞).

2.4.4 Planning

- Landscape photography is basically photography where you click scene representation. Nightscape photography is basically photography where you click night-time photos.
- Check the night pollution level at your place. You may go to your village side also.
- Mid-March to mid-November is the best time to click photos (of the Milky Way).
- Apps to help you find the Milky Way: Stellarium, Star Walk, PhotoPills, Skyguide. Bring a compass when your cell phone does not work.
- The best time to click photos is 10 pm to 2 am. You may click at other times, for example 3 am or 9 pm, but the settings above are recommended for the best photos.

The best months for the Milky Way core depend on latitude and hemisphere (roughly March to October for the northern hemisphere). The notes' "mid-March to mid-November" is as written.

2.4.5 Twilight

Stage	Sun below horizon	Dusk name
Civil twilight	6°	civil dusk
Nautical twilight	12°	nautical dusk
Astronomical twilight	18°	astronomical dusk
Night	beyond 18°	

After sunset comes civil dusk, then nautical dusk and astronomical dusk, after which it is night.

2.4.6 Moon phases

- When will the moon rise or set?
- What moon phase is it in?
- How will it affect my image?

2.4.7 Checklist

- A camera capable of long exposure and a sturdy tripod to prevent camera shake.
- A fast lens that will draw in more light, like $f/1.4$, $f/1.8$ or $f/2.8$.
- A remote trigger or intervalometer for more complex photos.
- A headlamp, preferably with a red light.
- Composition and focusing at night. Keep a hand map with you. Finding ∞ at your lens.

2.4.8 Advanced techniques to lower noise

- Blending two exposures.
- Star trackers (iOptron, Vixen Polarie and Sky-Watcher).
- Star stacking using Photoshop or Starry Landscape Stacker (Mac only).
- Use lights sometimes; use diffusers also.
- Level your tripod. Use a pano tripod head with degree marking. Find your nodal point to avoid parallax.