Photo: Ulla Lohmann, Canon Ambassador

LOW LIGHT PHOTOGRAPHY

Master the dawn and the dark

- BASICS
- EQUIPMENT
- PRACTICE

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LITTLE LIGHT, MANY POSSIBILITIES

Intro

In this guide, we look at how to take high-quality photos in low light, and the technical and creative aspects involved. We also recommend which camera models and lenses are best for different types of low-light photography, and which accessories are useful in different shooting situations.

GOLDEN MOMENTS IN THE BLUE HOUR

Basics

No photography without light. But low light does not automatically mean fewer photographic opportunities. On the contrary, twilight and night provide all kinds of exciting subjects. The same goes for subjects in artificial light and candlelight, or cityscapes in neon. If you want to take good photos in low light, you need special equipment and a certain amount of expertise.

EXPOSURE: THE BASICS

The exposure of an image is essentially determined by three factors:

- Exposure time.
- The aperture.
- ISO sensitivity.

The longer the exposure time, the more light falls on the camera's image sensor.

- The longer the exposure time.
- the larger the lens aperture.

Increasing the ISO sensitivity does not mean "more light", it simply means that the light available to the camera is amplified.

Tip: Assessing lighting conditions correctly
Where our eyes can still see a sufficiently bright environment due to the dilation of the pupil, the camera already has exposure values that can result in blurred, out-of-focus or underexposed images. This is at least the case if you are not using a flash or a high ISO setting.

You can practice assessing lighting conditions. Simply estimate the shutter speed required for a correct exposure at a given aperture (e.g. F4) and ISO sensitivity (e.g. ISO 400), and then compare it with the camera's exposure value.

EXPOSURE: SHOOTING MODES

The "green wave", or "A" setting on a camera‘s programme dial, sets the shutter speed, aperture and ISO sensitivity to suit the subject. This produces correctly exposed images for most subjects. There are good reasons to use semi-automatic or manual modes, especially when shooting in low light. In some cases, the creative possibilities are greatly enhanced:

- Scene mode **P** also controls aperture and shutter speed, but allows manual settings for exposure compensation and ISO sensitivity.

- In **Tv** mode, the photographer specifies the preferred exposure time, hence the name 'shutter priority' or 'aperture priority'.

The camera then determines the appropriate aperture based on the exposure measurement. Advantage: In low-light conditions, this automatic mode can be used to prevent camera shake or blur caused by movement of the subject. Simply select a short enough shutter speed for the subject and set focal length.

- In aperture priority (**Av**) mode, the photographer selects the lens aperture. The camera calculates the correct exposure time based on the aperture.

You should use aperture priority if you want to control the distribution of sharpness in the image: A small aperture (= large f-number, e.g. 16) results in a sharp image from front to back. Conversely, a large aperture (= small f-number, e.g. 2.8) allows the main subject to stand out from the blurred background. This is called "selective depth of field".

- In manual mode ("M"), you can freely select both the aperture and shutter speed. This mode offers the greatest creative freedom, but requires more photographic knowledge and experience. You can check that the subject is correctly exposed using the exposure scale in the viewfinder or on the screen.

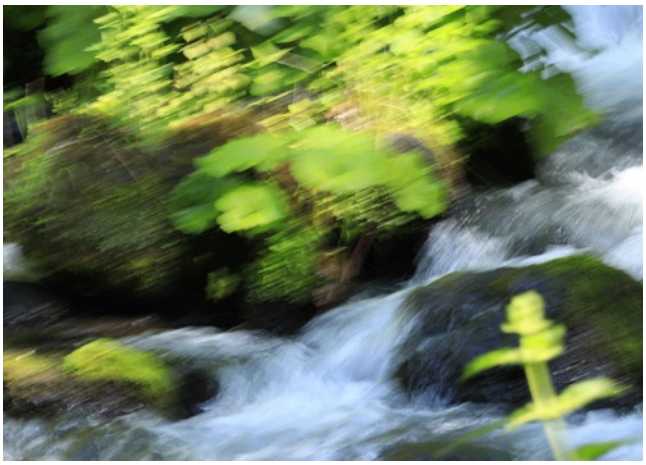
In this low-light portrait, the background is blurred by opening the lens aperture. Use the Av or M mode to pre-select the aperture.

Tip: Exposure compensation

With certain subjects, such as a backlit portrait in low sunlight, the main subject (the face) is often too dark because the direct sunlight has a disproportionate effect on the exposure reading. You can counteract this with exposure compensation. This function allows you to brighten or darken the image in small increments (1/3 f-stop). Alternatively, you can use the bracketing function to create a series of automatic exposures.

4VOIDING BLURRING

In low-light situations, longer exposure times often lead to two types of image errors: blur caused by camera shake and motion blur. These errors can be reduced by increasing the ISO setting, using fast lenses or lenses with an Optical Image Stabiliser (OIS).



What causes camera shake?

Camera shake occurs when the exposure time is too long, causing unwanted camera movement when taking handheld photos. The result is a blurred picture.

Avoid unwanted camera movements that can occur when taking handheld photos. For example, when shooting, 'clamp' the camera between your head and hands and rest your elbows on your upper body. Or by placing the camera on a solid surface or tripod.

What causes motion blur?

Motion blur occurs when the exposure time is long enough for fast moving objects in the scene to move in the frame during the exposure. The static parts of the image may be sharp.

Tip: Choose a shorter exposure time by setting a larger aperture or higher ISO sensitivity.

Tip: Use lenses with an optical image stabiliser (IS system*). Stabilised lenses allow you to use shutter speeds up to five f-stops longer than without the IS system. For example, you can take sharp pictures at ¼ second instead of 1/125 second. Note: The IS system cannot compensate for blur caused by moving subjects. The only way to avoid motion blur is to use a shorter exposure time (see above).

Most of the advanced EOS R cameras feature in-body image stabilisation. Combined with the stabilisation of an RF lens with IS, exposure times can ideally be extended by eight stops without the risk of camera shake.

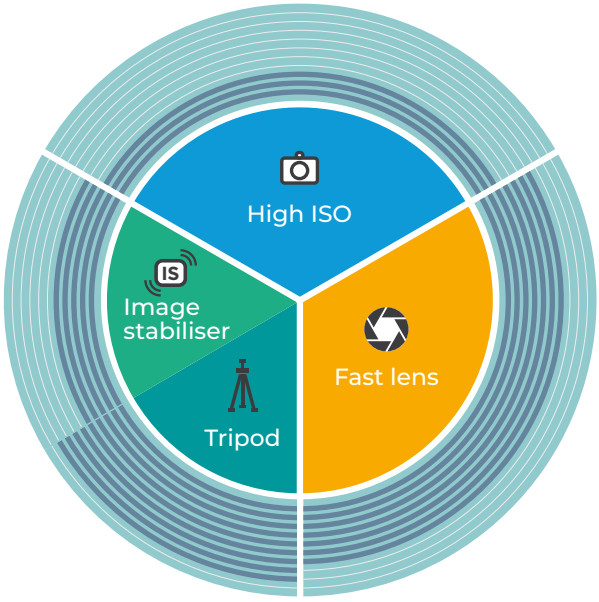
LOWLIGHT PHOTOGRAPHY

When taking photos in low light, high ISO settings on the camera, fast lenses, image stabilisation or a tripod can be used, depending on the subject.

Landscape

What matters in the picture:
Details and large depth of field

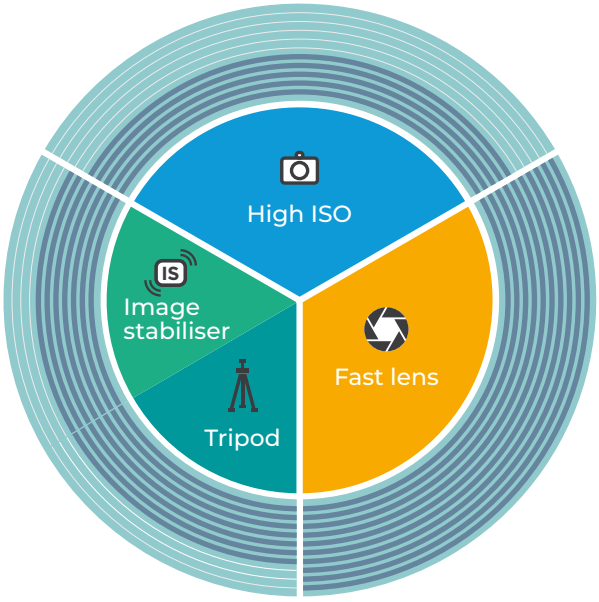
Priority for exposure:
Small aperture



Portrait

What matters in the picture:
Selective focus and nice bokeh

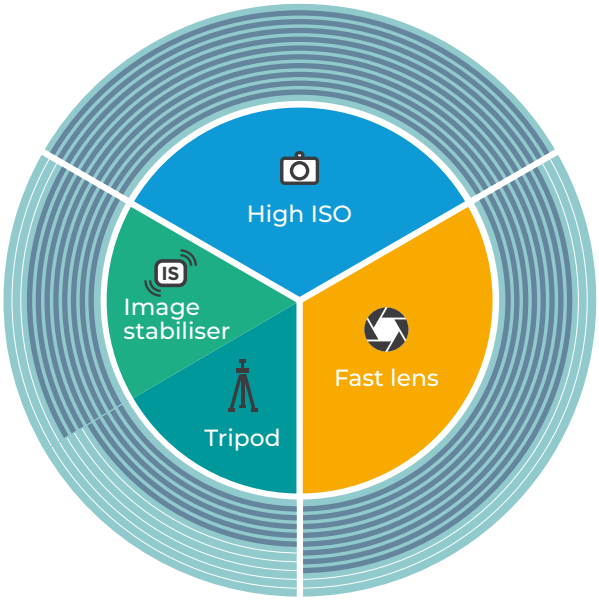
Priority for exposure:
Large aperture



News

What matters in the picture:
Sharpness and large depth of field

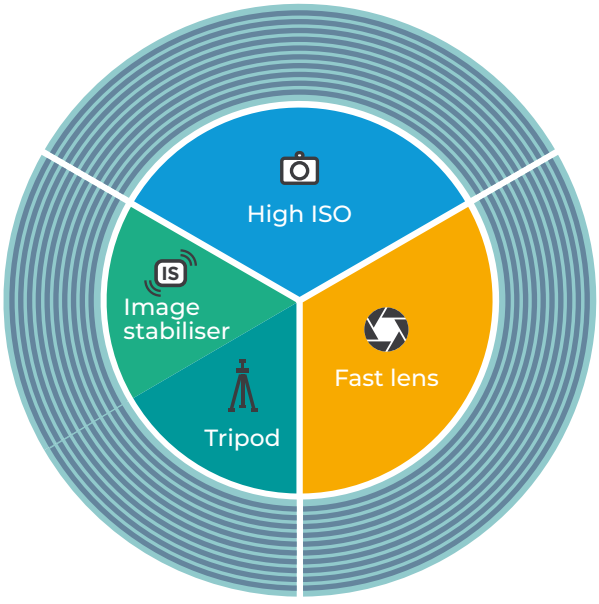
Priority for exposure:
Short exposure times



Sports

What matters in the picture:
Sharpness, selective focus

Priority for exposure:
Short exposure times



WHITE BALANCE: THE COLOUR OF LIGHT

The camera‘s white balance is used to adjust the camera to the colour of the light. The aim is to reproduce colours as accurately as possible - as the human eye sees them.

In daylight, and in most mixed lighting situations, the automatic white balance (AWB) will usually deliver flawless results.

If you want to further optimise your images with regard to light and colour conditions, you can alternatively use predefined profiles for different lighting situations (cloudless sky, closed cloud cover and artificial light types such as incandescent or neon lights).

For the most accurate results, use manual white balance: with a white sheet of paper (or better still, a grey card) in front of the lens, you can calibrate the camera to the specific colour temperature. Grey cards for photography are colour neutral and are often used in fashion and product photography where accurate colour reproduction is important.

When shooting RAW, you can also change the white balance afterwards.

SETTING THE ISO SENSITIVITY

The lower the ISO setting, the better the image quality. This is because the higher the sensitivity, the more unwanted noise and grain in the image. When shooting in low light, it is often necessary to use a high ISO setting to ensure correct exposure.

In general, the larger the sensor and the lower the resolution, the lower the tendency to noise. This is because each pixel has more space on the sensor surface to capture more light.

While many smartphone cameras have very small image sensors and start to show visible noise at ISO 400, system cameras with APS-C or full-frame sensors can increase their sensitivity to ISO 6,400 and beyond without the noise noticeably affecting image quality.

Tip: Quickly adjust sensitivity to changing light conditions with Auto ISO. When lighting conditions are constantly changing, such as at sunset or when shooting in rooms with different lighting, the Auto ISO function comes into its own. It adjusts the ISO sensitivity almost instantly, faster than manually. To prevent loss of quality at very high ISO settings, most cameras allow you to set an upper limit above which the ISO sensitivity automatically increases.

CREATIVE EXPOSURE: BLUR AND LOWKEY

Basically, a subject is "correctly" exposed when it is sufficiently bright and neither blurred nor out of focus.

Depending on the subject or creative intent, motion blur may be desirable. This effect can be used to make movement "visible", making the image appear more dynamic. The easiest way to achieve this effect is to use the automatic aperture control.

For example, you can set the shutter speed to 1/2 s - to make people walking across a square, disappear in the blur.

When the camera is on a tripod, the rest of the scene, such as buildings, traffic signs, etc., will be in focus.

Deliberate underexposure of the subject can also be attractive. Particularly in black and white photography, the "low-key effect", in which dark tones predominate, can give subjects a special appeal. The easiest way to achieve this style is to reduce the exposure using exposure compensation or manual exposure.

EQUIPMENT FOR LOW LIGHT PHOTOGRAPHY

Equipment

Your equipment plays an important role in low light. Your camera should be capable of high ISO speeds. A fast lens with an IS system and a tripod will also help you to get the most out of low light.

CAMERAS FOR LOWLIGHT

In general, the larger the sensor and the faster the lens, the better the camera will perform in low light.

EOS system cameras offer the best conditions for successful low-light photography. This is because large image sensors allow the use of fast interchangeable lenses.

Full-frame system cameras have image sensors as large as classic 35mm film (24x36mm). Each individual pixel on the larger sensor has more surface area and can therefore receive more light. This is especially true of the R-series mirrorless cameras. The EOS R6 Mark II has an excellent ISO noise ratio. ISO values of 12,800 and above are no problem. This is a crucial criterion, especially for low-light photography.

Other EOS R cameras such as the Canon EOS R7 or EOS R10 feature an APS-C sensor, which is around 60 percent smaller than a full-frame sensor.

For the same resolution, noise is slightly higher at higher ISOs. On the other hand, APS-C cameras and lenses are more compact, lighter and less prone to camera shake when handheld, given the same equivalent focal length as a full-frame camera. For example: On an APS-C sensor camera, a 50mm lens has an equivalent focal length to an 80mm lens on a full frame camera.

The weight and size advantage is even more with EOS R system cameras and lenses.

CAMERA: THE VIEWFINDER

The electronic viewfinder which you find in mirrorless cameras are in many ways superior to an optical DSLR viewfinder. For example, the electronic viewfinder image can also display various camera‘s settings.

As a photographer, you can see in real time whether your image is correctly exposed and what happens when you change parameters such as aperture, exposure time or white balance. The electronic viewfinder can also amplify the available light, which is particularly useful when shooting at night.

As large and bright as possible

The viewfinder is the most important interface between photographer and subject. When buying a mirrorless camera, you should pay particular attention to the quality of the electronic viewfinder. With 5.76 million pixels, cameras like the EOS R5 Mark II offer a detailed, bright, large and responsive viewfinder image.

LENSES: WHAT MATTERS MOST

The lens is the camera's eye. In low-light situations, two features are particularly useful: high speed and optical image stabilisation.

Lens speed

The aperture of the lens is similar to the iris of the human eye. It changes the size of the aperture opening, allowing more or less light to enter. When you move to the next larger aperture stop, the amount of incident light doubles.

For the same exposure, the exposure time required to get a sharp image of the subject is halved. For example, if an exposure time of 1/15s is indicated at f/4, you can shoot at 1/30s at the next largest aperture (f2.8), 1/60s at f/2, and 1/125s at f/1.4.

For this reason, fast lenses such as the portrait classics RF 85mm F1.2L USM, or the affordable Canon RF 50mm F1.8 STM, are ideal for shooting lowlight.

Image stabilisation

Image stabilised lenses compensate for unintentional camera movement. This reduces the risk of camera shake when shooting handheld, even with longer exposures.

Lenses such as the Canon RF 24-105mm F2.8 L IS USM allow a 5-stop increase in shutter speed thanks to the built-in image stabiliser (IS).

In practice, the advantage is enormous, as an example calculation shows: At a focal length of 105mm, which would require a shutter speed of 1/100 second without IS, you can take sharp pictures at 1/4 s with IS.

And if you are also using an EOS camera with IBIS you can achieve up to 8 stops, equivalent to 2 sec. exposure time.

LENSES: CHOOSING THE FOCAL LENGTH

Which focal length is the right one? The answer depends less on the available light and more on the subject.

- For landscape and architectural photography, wide-angle lenses are usually the lens of choice. They capture a wide angle of view and optically distant objects, emphasising the expanse of the landscape. For cameras with an APS-C sensor, the wide-angle range starts at a focal length of around 18 mm; for full-frame cameras, 24 mm lenses are considered 'true' wide-angle.

- For street and reportage photography, focal lengths between 28mm and 50mm are considered the ultimate in full-frame photography. They are close enough to the action but still provide a good overview. With APS-C cameras, this corresponds to focal lengths of around 18 to 28 mm.

- Portrait photography is best achieved with short telephoto lenses. The RF 85mm F1.2L USM and the RF 135mm F1.8 L IS USM are ideal for this genre. Thanks to their longer focal length and high speed, they produce a pronounced crop effect (face in focus, background blurred). At the same time, it reproduces the proportions of the face in a natural and low-distortion manner. The RF 50mm F1.8 STM is ideal for portrait shooting on APS-C cameras.

- Wildlife and sports are best captured using a longer focal length, such as the Canon RF 100-500mm F4.5-7.1 L IS USM lens.

LENSES: ZOOM OR FIXED FOCAL LENGTH

Both approaches have their strengths. Zoom lenses such as the Canon RF 100-500mm F4.5-7.1 L IS USM, RF 24-240mm F4-6.3 IS USM or RF-S 18-150mm F3.5-6.3 IS STM, designed for EOS R cameras with APS-C sensors, offer a wide range of focal lengths.

This means that they can cover a broad range of situations and save weight. On the other hand, there are the advantages of fixed focal lengths: they are more compact and faster.

ACCESSORIES: SPEEDLITE FLASH

The sun in your bag

Creative flash photography is no longer rocket science, thanks to intelligent technologies such as Canon's E-TTL II metering, which uses a pre-flash through the lens to determine the amount of flash required, even taking into account the distance to the subject.

Cameras such as the Canon EOS R10, R50 or R100 have a built-in flash. When a higher output than the built-in flash is required, or when the camera does not have a built-in flash, external flashes such as the Canon Speedlite EL-5 are needed: despite its compact size, this mid-range flash offers enough power for a wide range of outdoor scenes and larger rooms.

The Speedlite EL-5 also offers remote flash functionality. This means that one or more flash units can be placed anywhere in the room to individually illuminate a subject. The latest EOS R system cameras have built-in flash control, allowing remote flash firing from up to ten metres away. Using the Canon Speedlite Transmitter ST-E3-RT or ST-E10, distances of up to 30 metres can be covered by wireless remote control.

ACCESSORIES: TRIPOD FOR A SECURE STAND

A tripod is a good option for night shots and long exposures - or when flash is not an option for creative or technical reasons. The type of tripod required depends on the exposure time, focal length of the lens and total weight of the equipment.

For full-frame cameras with large lenses, long focal lengths and long exposures, the classic tripod will give you blur-free shots. For smaller set-ups or shorter focal lengths, a more compact and lighter monopod can be used as a "holding aid".

GET CREATIVE WITH LOW LIGHT

Practice

In this chapter, we give you ideas for low-light subjects - and tips on how to shoot them.

LANDSCAPE: TWILIGHT MAGIC

The timing

If you want to get some exceptional landscape shots, be ready with your camera and tripod before the sun rises - and then again in the late afternoon, when the sun casts a warm, soft light and atmospheric shadows. When the sun is even lower, its light is refracted by the atmosphere or clouds, creating spectacular colours - from orange to red to purple. This alone can turn an unspectacular scene into a spectacular one.

Tip: Use the app to find the golden or blue hour

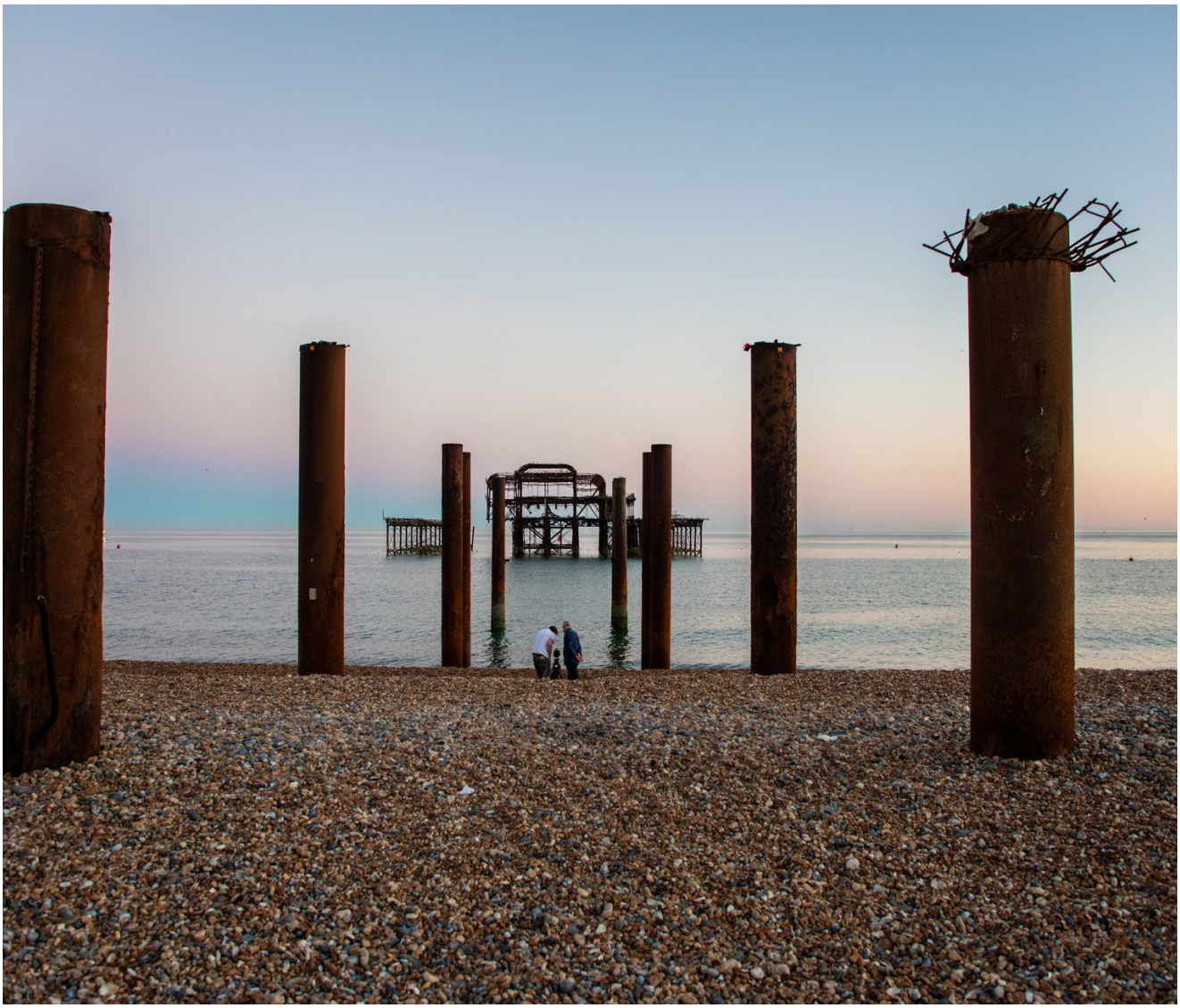
The term "golden" or "blue hour" is misleading because, at least in summer or in southern climates, it actually lasts only half an hour. The beginning and end also vary according to latitude and season. The same goes for the phases of the moon in different parts of the world. If you want to plan your shots precisely, you can help yourself with a (free) smartphone app.

LANDSCAPE: MOONLIGHT

Full moonlight is attractive to landscape photographers because of its reduction to a few colours. In addition, the pale and cool light flattens areas, blurs topographical contours and suggests something mysterious. If you want to focus directly on the full moon, it is best to use a telephoto lens. Set the aperture to 5.6 or use a tripod.

Tip: Exposure from a creative perspective
The "correct" exposure of landscapes is solely in the eye of the beholder. If you have little time for your shot, the appropriate scene programmes are the best choice. Otherwise, it is advisable to work with bracketing or the exposure compensation function.

Advanced users can use manual mode to find the ideal combination of aperture and exposure time.



LANDSCAPE: IMAGE COMPOSITION

Consider focal length, angle and composition

Use a tripod whenever possible: this is the first rule of low-light landscape photography. Beyond that, the same recommendations apply as for any other daylight situation.

Whether a subject 'works' depends largely on point of view, perspective, angle and composition.

Wide-angle lenses open up landscapes, an elevated shooting position creates an overview and conveys a sense of grandeur. Conversely, a frog's-eye view makes even a molehill look impressive. Playing with (sharp) foreground and (blurred) background - or vice versa - also creates excitement.

Tip: Less is more

Take a look at the work of professional landscape photographers: Restriction is the key. The reduced play of colours, shapes and textures gives a landscape photograph a painterly, abstract effect - especially in the warm, soft light of the early or late sun.

CITY: GOLDEN HOUR IN THE STREETS

Golden Hour

The low sun also provides the best conditions for atmospheric city panoramas. When the buildings cast long shadows on the streets and the facades of the houses give off a warm and inviting glow, it makes for exciting photography.

Tip: Street and black-and-white photography with a graphic feel

Less is more also applies to street and black-and-white photography in urban environments. The most successful images include shots where people and buildings are silhouetted in the light of the low sun, giving them an almost graphic quality.

CITY: BLUE HOUR AND NIGHT

Golden Hour

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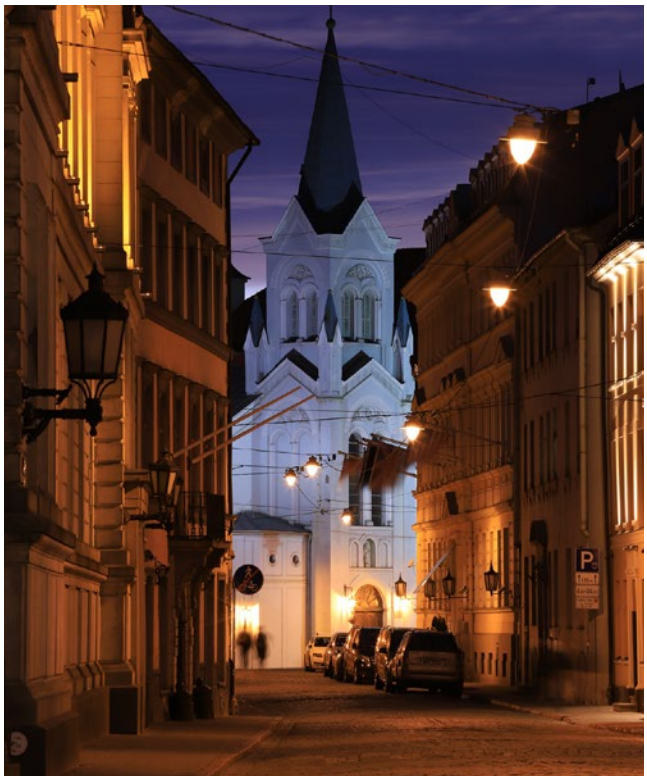

CITY: SHOOTING TIPS

During the blue hour, there is often enough residual light to shoot handheld with a fast, image-stabilised wide-angle lens, even at moderate ISO values. If it gets even darker, a tri-pod is recommended - but if necessary, a bridge railing, bench or similar will often do. It is also important to use a remote or self-timer. This will prevent camera shake when you press the shutter button.

Tip: Connect App
With the Canon Camera Connect App for your smartphone, you can remotely trigger compatible EOS or PowerShot cameras and control many other functions wirelessly.

Tip: Check exposure using the histogram
The contrast range - the spread between the brightest and darkest areas of the image - is huge in brightly lit cities. As a result, overexposed areas of the image may be white, while other areas are completely black and lack detail. The histogram is a good way of checking whether the camera can handle the contrast range. A high bar on the left indicates that large areas of the image are underexposed, while a high bar on the right indicates overexposure. The solution: adjust the exposure using exposure compensation until the bars no longer touch the left or right edge of the histogram.

CITY: PLAYING WITH LIGHT

Long exposures are particularly appealing at night, because they depict the environment differently from how we see it with the naked eye. One of the classics is the red and white streaks of light left by passing cars.

Beautiful wipe effects can also be achieved with fireworks or illuminated fairground rides. Water surfaces, such as rivers, offer exciting creative possibilities. With a long exposure time, the contours become blurred, creating a soft surface that reflects the lights of the city. Even a puddle of water reflecting neon lights can turn an ordinary subject into an extraordinary one.

Tip: Long exposure
Place the camera on a tripod, set the sensitivity to ISO 100 and adjust the exposure time in the automatic aperture (Av) mode up or down until the desired blurring effect is achieved. A small aperture (e.g. F11) ensures that the image is sharp from front to back. You can compensate for underexposure by gradually increasing the ISO value.

PORTRAIT: LESS LIGHT, MORE EXPRESSION

Portraits taken in available light require relatively little technical effort and look natural. Evening or morning light produces particularly good results. Shadows are softened and the warm light enhances skin tones.

Indoor photography

Anyone who has taken pictures at parties or Christmas will be familiar with the problem: when you take pictures without a flash, the images come out too dark and/or blurry. If you switch on the (automatic) flash, objects in the foreground appear cold and cast hard shadows, while areas at the back of the room are barely visible.

Tip: Creative portraits against the light

Photographing with the sun, not against it, is one of the oldest rules of photography. Sometimes, however, breaking this rule can lead to particularly impressive results. For example, when you want to create a silhouette-like portrait instead of a well-lit one. Or when the backlight from the low sun creates a grazing light at the edges of the foreground (the face). If the face is too dark, fill-flash will help.

PORTRAIT: BRIGHTENING WITH FLASH

You can use the camera's built-in flash or an external flash to illuminate the foreground. The easiest way to make the most of the available light is to use slow sync with the flash. This ensures that the foreground is correctly exposed. At the same time, the exposure time is long enough to retain the residual light.

You can avoid "flashed to death" pictures by using indirect flash. You can tilt the reflector of the flash so that the light is directed towards the ceiling or wall. By diffusing the light from the flash, you can achieve even, natural looking lighting.

PORTRAIT: FACES IN THE NIGHT

Night portraits require a sure instinct. Switching on the automatic flash quickly results in a chalky white face against a black background.

Manual flash exposure compensation allows you to subtly reduce the flash light in the minus direction. It's even easier with the "Night Portrait" scene mode.

Tip: Use and complement existing lighting
Street lights, neon signs, vehicle headlights: you can also use existing light sources to illuminate your model's face at night. The advantage is that you usually get a harmonious overall picture, because the face and the ambient light are in colour harmony.

Tip: Setting accents in the dark
With long exposure times, you can also use light of a torch to "draw" any structures in the black of the night - a symbol or a whole word.

MORE OF THIS?

Want to learn more about exposure? At the Canon Academy workshops, our trainers will teach you step-by-step how to get the perfect exposure for any subject, but the Canon Academy has much more in store for you.

Check the Canon Academy website for the latest workshop offers and dates.

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