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How to Photograph the Moon

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BY NASIM MANSUROV | 77 COMMENTS

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If you own a DSLR or a point and shoot with an optical zoom, I'm sure that every once in a while you see a beautiful moon and you think about taking a picture of it, especially when the moon is full and beautiful. There are other times when you spot a news announcement about a [Lunar Eclipse](#) and you think about capturing the moment, but do not know how to do it right. Or you want to capture the moon together with a foreground object such as a house or a lone tree, but the picture is not coming out right because the moon is much smaller and looks like a white blob. If you had any of these situations or simply want to find out how to take a picture of the moon with a digital camera, then this guide is for you.



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Moon photography or How to photograph the Moon

1) Why does the moon look smaller in pictures?

Before we start talking about how to take a picture of the moon, let's first answer some basic questions. I'm sure if you have already attempted to take a picture of the moon, you probably ran into a problem where the moon looks tiny in comparison to what you saw while taking the picture. Why does the moon get photographed so much smaller? The simple answer is – you are probably taking a picture of the moon with a wide-angle lens. Keep in mind that your eyes are like a 50mm fixed lens and if you are taking a picture with a wide-angle lens that is shorter than 50mm, the moon will be captured in smaller size! So, if you want to capture an object like a big tree or a house with the moon, you would need to stand further away and photograph the scene at least at 50mm to try to match what you saw with your eyes. And even at 50mm the moon might look smaller, especially if it was near the horizon when you took a picture of it. This also happens because of a phenomenon called “Moon illusion”, where the moon appears bigger to your eyes, when in fact it is not.

2) Why do I see the moon as a white blob?

If you have taken a picture of the moon after sunset and it looked in the picture like a white circular object rather than the moon, it is because the moon was overexposed. When you take a picture of the moon with other objects around it (as in the example with a tree above), your camera by default will meter, or calculate the exposure, based on everything but the moon. This happens because the moon is too small in comparison with the objects around it and a single spot of light should not affect the overall exposure of the picture. Think of it as a light bulb – if you take a picture of a dimly lit room with a visible light bulb, the room will be exposed normally, while the light bulb will be overexposed. If the camera measured exposure on the light bulb, the room would be completely dark, while the light bulb is properly exposed. The same thing happens with the moon – it works just like the light bulb at night and it will always be overexposed. During the day, however, this is not a problem, because the amount of light coming from the moon would differ only slightly in comparison with the objects around it, including the sky. So, why do our eyes see everything normally, while a digital camera cannot? That's because our eyes and our brain can see a much broader range of light. In photography terms, this is known as “dynamic range”.

3) Where and when to photograph the moon

Obviously, you should be taking a picture of the moon on a clear night with no clouds in the sky. Even a thin layer of clouds will make it impossible to get a clear picture of the moon, so absolutely make sure that the sky is clear. Pollution in large cities, especially in hot summer days will also play a big role, so I recommend getting out of town and traveling to a remote location with no light or air pollution, preferably at a higher elevation. The less the distance between you and the moon, the better the pictures. In terms of when to photograph the moon, take a look at this [US Navy Moon Phases](#) page, where you can find out what phase the moon is currently in and you can also calculate what it will be by picking the date from the bottom of the page. As for the time of the day – any time works, as long as the moon is visible.

4) Required equipment – Camera and Lens

1. A DSLR camera with a 200mm+ telephoto lens or a point and shoot camera that has an optical zoom capability.
2. A stable tripod.
3. Remote camera trigger (optional). If you do not have one, a timer in your camera will also work

If you want to enlarge the moon and show the details of the moon surface, a good telephoto lens longer than 200mm is almost required. The longer the lens, the better. If you have a telephoto lens that can take teleconverters, I highly recommend adding a teleconverter to increase the overall focal length. For example, a

1.4x teleconverter will increase the focal length of a 300mm lens by 40% or to 420mm total, while a 2.0x teleconverter will increase the focal length of the same lens to 600mm. The only thing to keep in mind, is that teleconverters negatively impact image quality and decrease the **maximum aperture** of the lens, so if you had a **300mm f/4 lens**, it would essentially become a 420mm f/5.6 lens (which is not that big of a deal, because you will be using higher apertures for moon photography anyway). As the focal length is increased, camera shake can also become a big problem. At long focal lengths of 300mm and above, even a slight move can screw up the picture. That's why if you are using a telephoto lens, a stable tripod is required to be able to produce a sharp image of the moon. Having a remote camera trigger also helps reduce the camera shake and if you have a Mirror Lock Up (MLU) feature in your camera, you can almost completely eliminate all vibrations.

The best setup for moon photography is an astro-telescope with a camera mount. Basically, you mount a digital camera to a telescope, which works as a long telephoto lens. But those setups can get very expensive and are suited best for dedicated astrophotography.

5) How to photograph just the moon

To photograph just the moon by itself, without any objects in the foreground, you will need a long telephoto lens like explained above to magnify the moon and try to fill as much of the frame as possible. Even with a good telephoto lens setup though, you will most likely be cropping the final image, simply because only a telescope would be able to provide enough magnification to fill the entire frame. With your telephoto lens mounted in your camera, secure it on a tripod and point at the moon. Make sure that your tripod is good and stable enough to accommodate and hold your lens and your camera. When it comes to **shutter speed**, **aperture** and **ISO**, here is what I recommend for general use:

1. **Camera Mode:** Set your camera mode to full **Manual Mode**.
2. **ISO:** Set your ISO to **100 if you have a Canon DSLR** and to **200 if you have a Nikon DSLR** (basically, whatever base ISO you have in your camera). For most other brands, the base ISO is also 100. If you have a point and shoot camera, see if you can find a menu setting to set your ISO to 100. **Make sure "Auto ISO" is turned Off.**
3. **Aperture:** Set your aperture to **f/11**.
4. **Shutter Speed:** Set your shutter speed to **1/125 on cameras with base ISO 100**, and to **1/250 on Nikon DSLRs** with base ISO 200.
5. **Lens Focus:** Set your lens to **manual focus** (either through a switch on the lens or on the camera) and set your focus to infinity. Be careful while setting the focus to infinity, as some lenses allow focusing beyond infinity. On more advanced DSLRs such as Nikon D300, there is a handy feature called "live-view with contrast detect", which can accurately acquire focus on distant objects. I have used it many times for my moon photography and it works great! If you do not have such a feature in your camera, then try setting your lens to the center of the infinity sign, then take a picture and see if it came out sharp by zooming in the rear LCD of the camera.

Examples:

Nikon D90 DSLR: ISO 200, Aperture f/11, Shutter Speed 1/250.

Canon EOS Rebel XSi: ISO 100, Aperture f/11, Shutter Speed 1/125.



The above aperture and shutter speeds are derived from a [Sunny f/11 rule](#), which is not necessarily very accurate for moon photography. I recommend starting with the above settings and adjusting the shutter speed based on the brightness of the moon. If it is too bright, set your shutter speed to a higher value. If it is too dim, set your shutter speed to a lower value. You can also play with aperture, but be careful, as changing the aperture to a small number can actually soften the image, while increasing the aperture to a very high number would mean slower shutter speeds. Remember, the moon moves pretty fast, so you definitely do not want to be photographing it with a slow shutter speed (certainly not below 1/100 of a second), especially when using a long telephoto lens.

Another thing I recommend doing is **bracketing** your shots. When I was taking a picture of the full moon, I noticed that some parts of the moon came out overexposed, while other parts were underexposed. I couldn't get a perfect shot to properly expose all areas of the moon, so I decided to try taking multiple shots of the moon, then merging them into HDR in Photoshop. To my surprise, the result turned out to be better than expected – the first image in this article was done that way. If you do not want to do an HDR of the moon, I still recommend to bracket the exposures – in worst case scenario, you will keep the best photo and delete the rest.

Lastly, for those who have long telephoto lenses longer than 400mm, you might be able to use "Aperture Priority" mode instead of "Manual", as long as you set your metering to **spot metering**. At 400mm and above, the moon fills enough of the frame to be able to use modes other than manual.

6) How to take a picture of the moon with a foreground object?

Let's now move on to how you can take a picture of the moon together with a foreground object – whether it's a tree, a house or a large rock. As explained [here](#), the moon will always look overexposed after sunset in comparison to everything else. The only way to capture the scene with the moon properly exposed, is to take two separate shots of the scene – one with the foreground properly exposed and the moon overexposed and one with the moon properly exposed and the foreground objects heavily underexposed. Take a look at the following two shots:



As you can see, I shot the above two images in two separate exposures – one with foreground properly exposed, one with the moon. Here is the combined shot that I did in Photoshop in just 2 minutes:



The above example is not the best one in terms of subject and composition, but it gets the message across – you will need to combine two exposures to create a single image. The toughest part is to properly mask out the moon and to transparently merge the darker edges of the moon with the blue sky, which should not be a problem if you know how to use the right tools within Photoshop. If the sky is equally dark in both frames, then the amount of time spent in Photoshop is minimal – all you would need to do is copy-paste the moon and you are set!

Also, I shot both frames with a 300mm telephoto lens. But what if I had a large object in front of me that I wanted to include in the frame? Obviously, shooting a long telephoto lens wouldn't work, since the object would not fit in the frame, so I would have to shoot the object with a wide-angle lens and then capture the moon with a telephoto lens, if I wanted the moon to appear larger in the final image.



7) Post-processing in Photoshop

No matter how good your image comes out of the camera, I still recommend doing some post-processing in Photoshop to enhance the look of your moon image. Take a look at this photo of the moon, straight out of the camera:



Moon photo straight out of the camera

Now, take a look at this image that I enhanced in Photoshop:



Moon photo edited in Photoshop

Click on both to see the difference. How did I do it? It was a two step process:

- a) Image->Adjustment->Curves and selected "Medium Contrast" Preset from the drop-down menu and clicked "OK".
- b) Filter->Sharpen->Unsharp Mask and added 150% in "Amount" field, while keeping the "Radius" on 1.0 pixels and "Threshold" on 0 levels.

Very simple and very quick!

8) Reuse the moon photo in other photographs

Once you have a couple of really nice pictures of the moon, why not reuse them for your other night photographs? You could make it whatever size you want (from small to large), you could get even more creative by adding clouds in Photoshop or changing the color of the moon to match your photo – basically, whatever you feel like doing!

9) Why photograph the moon?

So, why would one want to photograph the moon? I was asked this question several times before and my answer is simple – because we only have one moon and it is beautiful, so why not? The moon also makes the otherwise boring night sky look more interesting and can add a sense of enigma to a picture. While photographing the moon by itself might be somewhat boring, including the moon as an element of composition can yield great results. In addition, there are moon phases (crescent to full) that give even more