

## Shooting Video with DSLR Cameras



**Introduction:** Your name, where you work, how did you hear about DOM, any relevant experience, why do you want to learn to shoot video with your DSLR camera?

**Purpose of this class:** Students will learn the basics of shooting video, capturing audio, designing shots with editing in mind, specific camera settings and features, lighting consideration, and advantages to shooting video with a DSLR. This course will be a mix of lecture and hands-on instruction regarding practical operation and creative possibilities of shooting video with a DSLR Camera. Students do not need any production or video-shooting experience to take this class. Upon completion of this course, students will be able to shoot their own videos, and maximize creative and professional capabilities using a DSLR Camera.

**Membership:** Membership at DOM has a number of benefits, including access (after certification) to lighting, audio, tripods, and more professional equipment.

### **Programming Membership - \$ 75.00**

One year of access to our encoding kiosks to encode projects to our broadcast server, but no access to Field, Studio, or Editing equipment.

### **Field Producer Membership - \$ 175.00**

The Field Producer Membership is a limited membership package for those who wish to use field equipment, but have no need to use studio or editing equipment.

### **Studio Producer Membership - \$ 175.00**

The Studio Producer Membership is an affordable way to get access to Open Media's two production studios. Designed for studio production crew members who work on a studio crew, but have no need to access field or post-production equipment.

### **Editor Membership - \$ 175.00**

The Editor Membership is an affordable way to get unlimited access to Open Media's cutting-edge post-production suites. Designed for editors who have no need to access studio or field production equipment.

### **Unlimited Membership - \$ 250.00**

The Unlimited Membership is an affordable way to get access to all of Open Media's community resources.

### **Class Outline:**

**Student Gear Check – group by manual vs. automatic controls.**

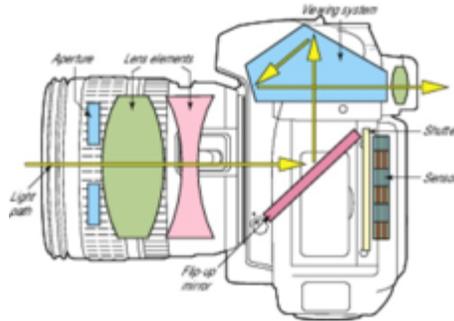
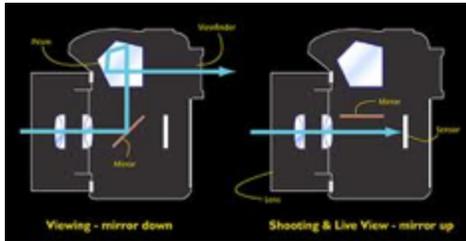
**\*Students find their camera model online and establish the capabilities of that camera (manual controls, audio options, etc.)**

**DSLRs are capable of capturing professional quality video – they are also capable of capturing terrible quality video. Understanding which settings give you the control you need is important in making that difference.**

First we'll take a look at some examples some great video shot with DSLRs.

### 1. Camera Basics:

A. DSLR: stands for digital single lens reflex. This means that there is one moving element that moves (the mirror, in this case) and exposes the sensor to light.



Most DSLR cameras use a CMOS (Complementary metal-oxide-semiconductor) sensor. These are a newer technology than CCD (charge-coupled device) sensors. CMOS sensors used to produce more noisy images but are fast approaching the quality that can be produced with a CCD sensor. CCD sensors use a “global shutter.” This means the image is created by exposing the whole sensor at the same time. CMOS sensors use a “rolling shutter.” This means not all of the image is exposed at the same time. Both of these don't have physical “shutters,” the effect is created by certain parts of the sensor being told to become sensitive to light by electrical impulses.

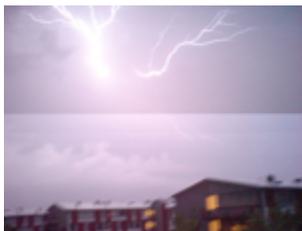
### Possible issues with a rolling shutter:



**Wobble:** also known as the jello effect. This happens when the camera is vibrating and produces a strange wobbling effect.

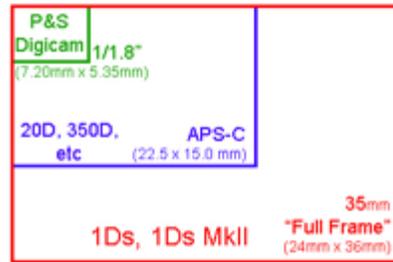
**Skew:** similar to wobble, this happens when the camera or subject move from one side to another, creating a skewed image.

**Smear:** this occurs when an object is moving at the same, or near to, the speed that frame is read by the camera. This will produce an image missing portions of the object that is motion. (see image at right).



**Partial Image:** This occurs when a quick, bright flash of light occurs during shooting, i.e. camera flash, lighting, strobe lights, etc. Since the image is being captured with a rolling shutter, the light is only capture on part of the frame. (see image at left).

### Sensors:



## B. Sensor: Benefits of full frame vs. cropped sensor:

1. Better high ISO performance.
2. Full focal length of lenses used. (Crop factor of 1.3x, 1.5x, or 1.6x depending on camera model) i.e. a 20-100mm lens becomes a 30-150mm on a APS sized sensor DSLR.

**NOTE:** *The reason you get better results from a 10megapixel DSLR vs a 10megapixel consumer digital camera is that by have a larger sensor with the same number of pixels, the pixels (really, photosites containing diodes) have to be larger. The larger the pixel, the more light it can gather, the less noise it produces in the image, capturing a greater dynamic range, and giving better performance at high ISOs.*

**Shooting stills vs. shooting video:** Chances are you bought this camera for shooting photographs. Shooting still images is similar to shooting video in certain aspects, but very different in others. With stills you are waiting for, or composing, a single image or frame – a moment stopped in time. With video you need to follow action, you will usually want multiple takes and multiple angles to edit together to make the video more engaging. Good framing and composition are crucial to both shooting video and shooting stills.

### Advantages of shooting video with a DSLR camera:

- Low Light Shooting – excellent low light, higher ISO shooting capabilities.
- High Quality Video– most DSLR cameras shoot in 720p and many now shoot in 1080p, both very high quality HD video.
- Interchangeable lenses – you can use a wide range of lenses, depending on the make of the camera you own, which gives you access to a wide range of aperture settings.
- Also a Still Camera – DSLR cameras are primarily still cameras, allowing you to switch from stills to video mode.
- Affordable – relatively speaking DSLRs (and their accessories) are more affordable than traditional and professional video cameras, while being able to produce high quality video.
- Film look – with the ability to shoot 24p, DSLR cameras can better recreate a film look.

**Disadvantages of shooting video with a DSLR camera (*The last advantage doubles as a general disadvantage*):** Also a Still Camera – DSLR cameras are primarily still cameras, which means they were designed primarily for taking still photographs.

- Audio – DSLRs do not have XLR inputs, the most common connection for external microphones. They generally only have 1/8" inch stereo jacks. **SOLUTION: Turn off auto controls if you have them, buy an either an external microphone, either that plugs directly into the camera with the 1/8" jack, or buy an external microphone and a preamp solution (JuicedLink, BeachTek) or an external recorder (Sony Zoom H4n).**
- Stability – Some lenses have stabilization, some camera bodies have stabilization, but

since the body of the camera was not initially designed for shooting video, shooting can still be awkward and camera shake is inherent. **SOLUTION: Tripod, monopod or stable surface.**

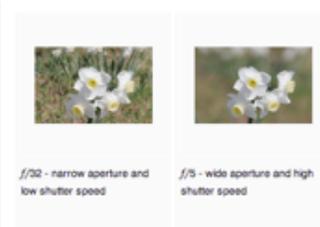
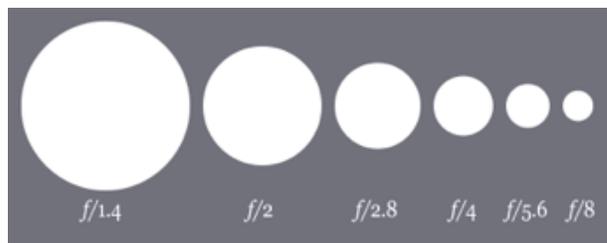
- Filters – To take full advantage of the depth of field range you will want the aperture to be opened up. Even at ISO125, when you are a bright situation you will not be able to open up the aperture without overexposing the shot. **SOLUTION: ND filters, available in various stops.**
- Viewfinder – The viewfinder is disabled when shooting video (or in Live Mode) because the mirror is locked up to allow the light to pass uninterrupted to the camera sensor. The result is that you can only see the video on the LCD screen, which is difficult to see in many conditions. **SOLUTION: LCD loupe or hood.**
- Rolling Shutter/Jello Effect – This is seen when the camera is moved too quickly from one point to another, causing a bending or warping of the subject matter. **SOLUTION: Just don't do it.**
- Format – Video comes out of DSLR cameras compressed, either with H.264, Motion JPEG, or another compression that is not conducive to editing. **SOLUTION: FCP plugin for Canon. MPEG Streamclip (or other software) for conversion.**
- Recording Limit – Generally there is a 5-15 minute limit on takes – this depends on the camera make and model. **SOLUTION: Be creative – for live events, get some shots you can edit in, for interviews, keep an eye on the time and start/stop at natural breaks.**

**2. Manual, manual, manual:** The main factor in getting good video is having control over your camera's settings – manual control, not automatic. Auto settings tend to try and balance to an optimal image, often sacrificing quality in favor of equalizing exposure. This means that the camera will go to the highest ISO it can in low light settings, adding noise. The first step in capturing good video is understanding and controlling the following settings (the ability to switch to manual is dependent on the make and model of the camera):

**ISO (aka ASA):** Stands for International Standards Organization, based in Switzerland. Relates to the sensitivity of the image sensor, or more accurately, how much light is allowed to pass to the sensor. Film is rated by ISO. The lower the number, the finer the grain. As a rule, for film or video, you will want to shoot at the lowest ISO possible. The difference between still images and video is that noise reduction is much easier to achieve in post production on still images vs. video. It is generally accepted that with most DSLRs you should try to keep your ISO under 1000. The important thing about noise is that it appears in the darker, shadow areas of your footage. Therefore, if you are shooting a very well lit scene, with no shadows at high ISO, you may not get noise in the bright, highlight areas of the footage. **TIP: Use the zoom function to check for noise in shadow areas. BUT remember you're viewing HD footage on a screen the size of a credit card - even 12800 ISO footage will look good at that size.**

**F-Stop/Aperture:** When you open the iris on your camera your picture gets brighter, allowing you to shoot in dimmer conditions, but your depth of field shortens and it is harder to keep your subjects in focus. (Although it seems a bit backwards: the smaller your f-stop setting is (i.e. 1.4), the bigger the opening is (see below.)

**Shutter Speed:**

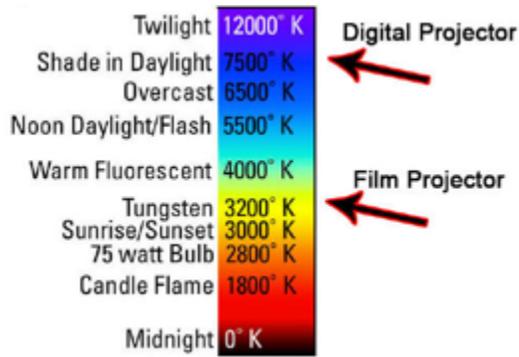


Shutter speed is how long the sensor in your camera is

exposed to light. To maintain the film look of shooting videos with your DSLR, set the shutter speed based on your framerate. If you are shooting in 24p or 25p you will want to set your shutter speed to 50 (1/50th of a second). Shooting in 30p, set your shutter speed to 60 or 1/60th. 50p or 60p, shoot at 100 and 120 respectively. These settings will give you the best looking video. Of course, to compensate for exposure you can go with faster shutter speeds with the understanding that these will effect the look of your video in a similar way to effecting a still image – the fast the shutter speed, the more motion will be stopped. Along the same lines, don't go below these settings as it will give you blur on movement of any kind.



**Color Temperature and White Balance:** Different lights have different color temperatures and the camera is much more sensitive to these differences than the eye. Flame, fire or candlelight (orange), household lights (yellow), tungsten, halogen and photoflood (between yellow and green), fluorescent (greenish), sunshine or daylight (blue).



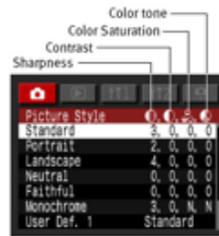
Degrees Kelvin	Type of Light Source	Indoor (3200K) Color Balance	Outdoor (5500K) Color Balance
1700-1800K	Match Flame		
1850-1900K	Candle Flame		
2000-3000K	Sun: At Sunrise or Sunset		
2500-2900K	Household Tungsten Bulbs		
3000K	Tungsten lamp 500W-1k		
3200-3500K	Quartz Lights		
3200-7500K	Fluorescent Lights		
3275K	Tungsten Lamp 2k		
3380K	Tungsten Lamp 5k, 10k		
5000-5400K	Sun: Direct at Noon		
5500-6500K	Daylight (Sun + Sky)		
5500-6500K	Sun: through clouds/haze		
6000-7500K	Sky: Overcast		
6500K	RGB Monitor (White Pt.)		
7000-8000K	Outdoor Shade Areas		
8000-10000K	Sky: Partly Cloudy		

Based on information from the book [digital] Lighting & Rendering Chart and colors (c)2003 Jeremy Birn for www.3dRender.com

You should always adjust your camera's white balance setting to get the correct color representation, no matter what kind of light you are shooting in. There are pre-sets for indoor and outdoor lighting, and a custom white-balance setting for everything in-between. A benefit of the live view is that what you see is (pretty much) what you get.

A main difference to consider here is that it is much more difficult to adjust white balance in post production on video than it is if you are shooting RAW images (or even JPEGs). When shooting RAW images, the information is captured in a grayscale, which is why you can just push a white balance preset button in your editing software and change it from sunlight to tungsten to flash and back without losing any quality. Not so with video. Avoid AWB, since this will change, but be sure to change it if needed, i.e. you are moving from shooting outdoors in direct sunlight to indoors under fluorescent lights. Bottom line, set your WB correctly to the lighting conditions you are shooting under.

**Picture Settings:** These are in camera settings that can be set to apply to still images or to video. You will want to shoot with these "Off," or set to Neutral. This will give you the most control over the look of your footage in post production.



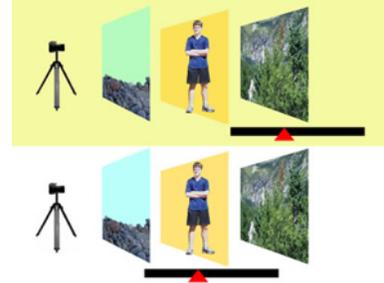
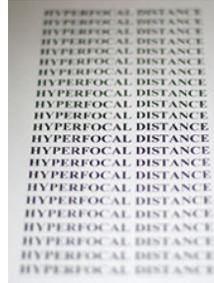
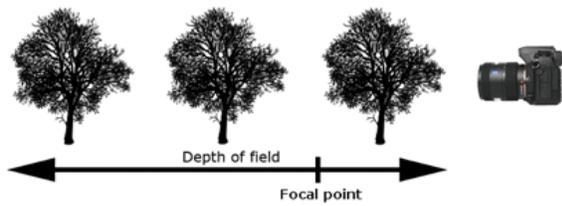
Picture Style screen



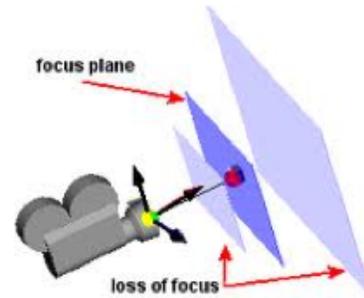
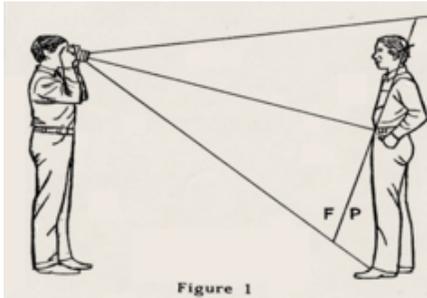
**Focus:** This needs to be done manually (some cameras allow you to use autofocus while shooting video, but you must be willing to wait the 5-10 seconds it takes for the autofocus to engage). Generally, you will want to focus where the subject will be over where it is (see later notes in Focus and DOF). It is very difficult to follow focus without having an external device made for that purpose. TIP: Use your zoom to check focus on subject instead of manually zooming.

**Two Fun (and potentially confusing) Notes:**

**1. Depth of Field** – the distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image – the important thing is this, remember that wherever you focus, 1/3 of the field of focus will be in front of the point of focus, and 2/3s will be behind.



**2. Plane of focus:** The plane of focus is the area that is in focus and is always parallel to the focal plane of the camera.



**Audio** – This is the most significant drawback to shooting with DSLR cameras. It is difficult to get good quality audio with most DSLR cameras. Since these cameras are designed for shooting stills they often limit your ability to capture and monitor sound. The first limitation is the ability to monitor sound as it is coming into the camera.

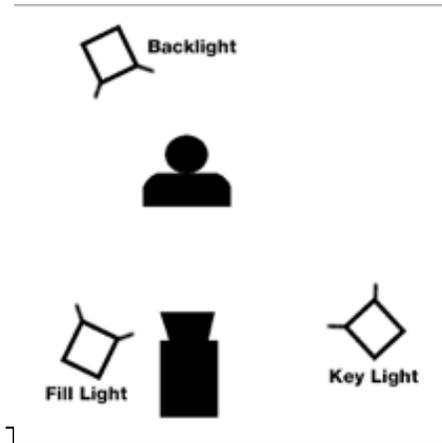
Here are some options:

1. In camera microphone: worst quality, not recommended. You also pick up noise from the camera and the lens, if you change zoom or change focus, or if you are using a lens with built in stabilization.
2. External microphone to mini jack: better quality, still compromised by the camera's ability to adjust levels. Many cameras do not have manual audio control, which will lead to the camera attempting to boost audio when levels are low producing a hissing sound.
3. External microphone to external audio device: best quality, most control, recommended.
4. External microphone to preamp device to mini jack: best quality, most control, recommended
5. Add audio in post: This can be music or voice over.

**5. Lighting:** The advantage of being able to shoot in low light situations does not eliminate the need to consider, and control, your lighting situation. All the right settings, and the best camera available will not make a poorly lit scene look good – it will make it look better, but not necessarily good, and certainly not great.

**Basic 3-point lighting setup:**

- o The Key Light: **The primary source of light for your shot.** your subject. Everything else is used to make your shot look pretty. The key light is a bright light placed on the broad side of the subject's face, usually at eye-level or significantly above and off to one side (which is more what we are used to), so there is some depth and shadows created.
- o The Fill Light: A diffused light, dimmer than the key, the fill light is placed on the opposite side of the subject, **filling in the shadows left by the key light** and ensuring the entire subject is properly exposed. (A reflector can also serve as a fill light.)
- o The Back Light: A small light, above and behind the subject, shining on the back of their head and shoulders. The back light casts a glow in the subject's hair and atop their shoulders, which helps to **separate them from the background.**



(In this situation, your interviewer would sit between the fill light and the camera.)

This is a basic lighting setup and can be used as a guide to lighting subjects other than interviewees, i.e. any subject, animate or inanimate. Light is your friend – get to know it, and use it! Lighting for video is always constant light, vs. strobe that can be used with stills.

An important asset is a reflector – this can range from a professional reflector, to any thing that is white in color (it's important that it's white so it doesn't add a color cast to your light) including a wall, the ceiling, a piece of Insulfoam (cheap and functional).



**6. Tripods and Monopods:** Mechanical image stabilization, in its simplest form, can be as simple as pinning the camera up against a wall or resting your elbows on a table. In its most complex form, it is a crane or a camera jib. The tripod is always your best, most stable option when you don't need to move the camera. A monopod is a cheap, mobile option with one pole that you hold steady yourself as it rests on the ground. A monopod is always better than a hand-held when you don't want an intentionally shaky image. Also, you should make all of your



As we've covered, focus is extremely important. The strongest tool in the cinematographer's bag of tricks (as far as controlling what the viewer is looking at) is focus. A full-face close-up in sharp focus in the foreground will dominate the audience's attention, diverting their attention from softer, unfocused images in the background. Conversely, a figure in soft focus in the foreground can occupy more than half the frame and yet attract less attention than a smaller figure in the background, proving that focus is more important than the location or size of the object.

**Rack Focus:** A shot where focus is changed while shooting. A rack focus is usually done to shift attention from one thing to another. (*Watch Depth of Field Video*)

**Use of Foreground:** Often times while shooting, people will tend to want everything out of the frame except for the subject they are trying to capture. Instead, try to use objects in the foreground to frame your shot, either leaving those out of focus, or having them in focus and the action behind falling out of focus.

**Multiple Angles:** Remember you shouldn't be shooting vertical when shooting video with your DSLR – but you can shoot an many angles between horizontal and vertical.

## 9. Shooting for Editing

- Minimum of 10 seconds per take. Don't be worried about camera shake at the beginning and end of your shot – do be worried about it in the middle of your shot.
- Focus where your subject will be, not where it is – follow focus is very difficult while shooting video with a DSLR. Of course, if your subject is not moving (or not moving much) you can set focus where they are, shoot, and move on.
- Ensure you are getting good audio (outlined earlier) but don't forget the importance of a reference audio = audio that you don't intend to use but will use to sync the higher quality audio to your footage.
- Never shoot vertical.
- Invest in a good performance memory card. The buffer on slower cards can fill during longer shots.
- Use a support – tripod, monopod, table, floor, chair, etc.
- Shoot A-Roll and B-Roll. **Watch A-Roll and B-Roll video**

### **Shooting Environment Checklist**

Lighting - only available or is it controllable?

White Balance - set to the dominant light source (or if possible, to an exact Kelvin)

ISO - Try to set to the lowest ISO setting possible, while understanding how this will impact your shutter speed, and f-stop.

F-stop/Aperture - Set this with a combination of desired DOF and how much light is necessary for a good exposure.

Shutter Speed - Set this with a combination of how much you desire to stop motion (or not) and how much light is necessary for a good exposure.

Focus - Set this with the understanding that  $\frac{1}{3}$  of your DOF is in front of the subject and  $\frac{2}{3}$  is

behind. Focus accordingly, and creatively.

#### **10. Mini shoots:**

We will now setup and shoot in 2 distinct shooting environments and put to use the shooting guidelines we have discussed in the first half of class.

1. Learning Lab - interview and broll
2. Upstairs or outside (weather dependent) - interview and broll

#### **11. Post Production considerations:**

Since most DSLR cameras capture video in H.264 or Motion JPEG, you will need to convert this footage before you are able to edit it. We recommend using MPEG Streamclip (free video conversion software) but there are other options as well.

Remember: Make sure you are converting to the same compression your project settings will be: i.e. many editors use ProRes422 or ProRes4444 as their project compression setting, therefore you will need to convert your footage, clip by clip, to the matching compression.