Digital camera operations

Camera operation is the most important part of photography. You will not be able to consistently produce images that communicate if you do not understand how to operate your camera.

The more familiar and knowledgeable you are with your camera, the quicker and more confident you will become in your photographic skills. Knowing how to assemble, set up and operate your camera will give you a better understanding of how to take better photos.
Electronic imaging

Electronic imaging is a photojournalist’s tool in which digital technology is used to capture, catalog and transmit images. It uses digital cameras and computers instead of film-based cameras and darkrooms.

Traditional cameras vs. digital cameras

If you know how to operate a film-based camera, you will find a digital camera similar in many respects. Digital photos can appear to have the same “look and feel” of traditional photographs, but there are many differences.

For traditional photography, you need a camera, film and a darkroom with chemicals, photographic paper and an enlarger. With digital imaging, you still need a camera, but now the computer, software and printer become your darkroom.

Traditional cameras record images on film. Then the film is processed, and prints are made. The digital camera, on the other hand, electronically records images on a charge-coupled device (CCD), which converts light reflected from the scene and stores it as red, blue and green pixels.

With digital cameras, pictures are ready to be reviewed, edited or shared instantly on the camera’s liquid crystal display, or LCD, panel. Images can also be transferred to your computer or viewed on a television -- all without processing costs -- though digital photography is not free.

A digital camera is as a computer with a lens. They are not as durable as a film camera in the cold or rain.
Digital images can be processed faster than film-based images. The images are downloaded onto a computer where they can be printed, e-mailed, displayed on a website or stored for later use.

**Advantages and disadvantages of electronic imaging**

Electronic imaging has been evolving since introduction of the digital camera in the 1980s. Below are some of its advantages and disadvantages.

**Advantages**

- **Saves time** -- It is much faster to acquire an image digitally and print it than to shoot a roll of film, process the film and then print the photos. Plus, the LCD on most digital cameras offer immediate viewing of images. You can also connect the camera directly to a computer and have the images displayed there. To view photographs taken the traditional way, you have to develop the film first. Digital cameras also offer instant transmission capability. Transmitting digital images requires Internet access to a Web or use of a direct satellite link, but once those are established you can send images from anywhere to anywhere within seconds. Conventional photography requires the use of mail to get your images anywhere. If you are overseas it can take several days to mail the images where you need them to go.

- **Saves money** -- With a digital camera system, once you buy the
equipment, you never need to purchase film or chemistry, saving you a lot of money. You still need to buy printer ink and paper (after processing equipment), but the cost of these items is significantly cheaper.

- **Environmentally sound** -- Using a digital camera system requires no hazardous chemicals. Conventional photography requires the use of many chemicals hazardous to the environment.

- **Random access** -- In conventional photography you would need to process the whole roll of film to get the picture that you wanted. With electronic imaging, you can pull just the image you want or need. Also, retrieval of stored files is much easier. Conventional photography requires hunting through file cabinets of photographs to find the image you need. With digital and a proper archiving system, you can run a search on the computer and quickly find the image that you want.

### Disadvantages

- **Image quality and cost** -- Great steps have been made in the quality of images that are produced by digital cameras from the earlier days of electronic imaging, but there are some limits. Higher quality cameras, printers and print media could be cost-prohibitive for some consumers.

- **Initial cost** -- Digital is cheaper than conventional in the long run, but you must purchase all the equipment first, such as the camera, computer software and computer in order to process the images.

- **Learning curve** -- Shooting with a digital camera is very similar to shooting with a conventional camera, but everyone may not have the aptitude, the time or desire to learn the nuances of electronic imaging’s hardware and software. Yet as the technology for both becomes easier to use, this may be less of an issue.

- **Reluctance to accept** -- Some people are still determined they will never use digital imagery.
Safety and maintenance tips

To prevent damage to your digital camera or injury to yourself, here are just a few basic safety and maintenance tips. Refer to your camera’s manual for more detailed safety and maintenance practices.

For your safety:

- Do not look at the sun or any bright light directly through the viewfinder.
- Do not use electronic equipment near flammable gas of any kind.
- Observe proper precautions when handling camera batteries.
- Do not apply heavy pressure to the LCD monitor. If breakage should occur, avoid contact with the liquid crystal.
- Always be aware of your surroundings when you’re shooting.

Your camera equipment may be sturdy, but it is not indestructible.

- Handle like any sensitive electronic equipment and do not drop or disassemble.
- Always wear the camera strap around your neck when shooting. Keep at least one hand on the camera to prevent it from swinging around and knocking into things.
- Keep equipment clean and dry.
- Always keep a lens on the camera.
- Keep away from strong magnetic fields.
- Do not touch the internal mirror.
Components

Learning the components of your digital camera will greatly enhance your experience as a digital photographer. With regard to the primary difference between a digital camera and a traditional film camera, it all comes down to one thing: the manner in which images are recorded. And how images are recorded has everything to do with a camera’s components.

In a traditional camera, images are captured and recorded on film. Film is broken down into frames or exposures. Each roll of film typically has from 12 to 36 frames. Once the entire roll of film has been shot, the film must be developed using a series of chemicals.

In contrast, digital cameras, like the Nikon D70 single lens reflex, or SLR, cameras used at DINFOS, are capable of producing and storing high resolution digital images on a compact flash card, or memory card, using a charge-coupled device, or CCD, which turns light into a digital signal.

This section of the lecture will cover the primary components of the Nikon D70: CCD, battery, compact flash card, lens and controls.

All digital SLR cameras have these components, but for specific information about the components of your digital camera, if different than the Nikon D70, refer to the camera’s manual.

Charge-coupled device (CCD) - The CCD is a sensor, or imager, that converts analog, or light, data into a digital format. The digital representation of the image, called a bitmap, is like a grid, and each position on the grid is recorded as a picture element, or “pixel.” The D70’s CCD is able to produce 6.1 million pixels per frame.

- The image comes through the lens in an analog form on a continuously variable scale.
- Each light-sensitive cell on the CCD measures the intensity of the light that falls on it.
- A red-green-blue filter in front of each cell allows the CCD to also record color information.
- The CCD sensor is diagonally smaller than a frame of 35mm film.
- The focal length is increased by 1.5, which makes the lens seem longer so the magnification of the images appears greater, i.e., 20mm=30mm, 50mm-75mm, etc.
Battery – The camera you use will determine the type of battery you need. Rechargeable nickel-metal hydride or rechargeable lithium batteries, or battery packs, offer extra life and viewing time.

- The Nikon EN-EL3a battery takes approximately 90 minutes to charge, and the camera must be turned off before inserting or removing the battery.

Compact flash card - The compact flash card, or memory card, is a small, solid-state removable memory drive that stores your images until they are transferred to a computer.

- Depending on the capacity of the card and the size of the photos you take, the cards hold anywhere from a few large files up to hundreds of large files.

- The size and quality of a digital image determines how much storage space the file for the photograph takes up. Operational controls on the camera allow you to select the size and quality of the image before shooting.

Lens – Lenses for SLR cameras are interchangeable, and having a variety of lenses at your disposal will allow you to take photographs with a wide range of views.

A 50mm lens is considered a “normal” lens, while a 20mm lens is considered a wide-angle lens.

Controls - Knowing the various operational controls on your camera — where they are and how they work — is essential to taking good pictures. It’s especially paramount during intense shoots so you will be able to change your settings without ever removing your eye from the viewfinder.

Camera controls vary from camera to camera, so if not using the Nikon D70, refer to your camera’s manual for the location and working of its controls.
**Important note:**
What follows in this section is a quick look at the most commonly used operational controls on the Nikon D70, which is all testable information. More detailed information about how to set these controls and how they work can be found in the "Assembly" and "Setup" sections of this lecture and in the Photojournalism Handbook. Refer to your camera’s manual for related information on its similar operational controls to ensure you set up your camera appropriately.

**Top view controls**
(Refer to the diagram, “Top view of the Nikon D70”)

- **Mode dial** – This movable dial allows for selection of various modes of camera functions. These modes range from full automatic control of camera functions to full user control of camera functions. These user-controlled modes — four of them — are called exposure modes. They are M (manual), A (aperture priority), S (shutter priority) and P (program). DINFOS students will set the camera on the M (manual) exposure mode for all activities in this course. The M (manual) mode allows the photographer to manually change both aperture and shutter speed settings, both of which must be adjusted to get a good exposure.

- **Metering mode button** – The D70 has an internal light meter that has three built-in exposure metering modes: matrix, center-weighted and spot. DINFOS students will set the camera on the matrix mode for all activities in this course. The matrix mode calculates the exposure based on everything in the viewfinder.

- **On/off switch** – The movable ring surrounding the shutter-release button turns the camera on and off.

- **Shutter-release button** – This button, when fully depressed, activates the shutter, which allows a picture to be taken. To “wake up” the camera when in power-save mode, slightly depress this button. To take a photo, fully depress the button.

- **Accessory shoe** – Also known as a hot shoe, it is located at the rear and top of the camera’s built-in pop-up flash, which DINFOS students will not use in this course. The hot shoe is the location where an electronic flash can be attached to the camera. In-resident DINFOS students use the Nikon SB-800 autofocus speedlight flash.

**Note:** When using any of the four exposure modes, the auto-focus lens’ manual aperture ring -- the ring on the lens closest to the body of the camera -- must be set at the smallest possible aperture setting, or the largest number on the ring. If not, the error code “FEE” will appear in the viewfinder and the control panel, and you won’t be able to take a photograph.
The control panel (top LCD) provides a wealth of information at a quick glance.

- **Control panel (top LCD)** - The control panel, depicted in the diagram on the left, provides a quick readout of several camera settings, as well as frame count and battery power.

- **LCD illuminator button** - This button turns on and off the control panel’s backlight, allowing the display to be read in the dark.

Top view of the Nikon D70
**Front View Controls**
(Refer to the diagram, “Front view of the Nikon D70”)

- **Sub-command dial** – Located near your right index finger when holding the camera (so it can be easily rotated), on the front grip just below the shutter-release button, this dial’s primary function is to control the camera’s f/stops. When used in conjunction with other controls, the sub-command dial can also be used to change other settings, such as image size.

- **Depth-of-field preview** - Located on the front right of the camera below the lens, this button allows you to preview the depth-of-field before you record the image.

- **Lens-release button** - Located on the left side of your lens, this button allows the lens lock to be released when you’re changing lenses.

- **Focus-mode selector** - Located just below the lens-release button, this lever allows you to select between manual (M) and auto-focusing (AF) modes, which control how the camera focuses. The M (manual) mode allows the photographer to manually focus, which is accomplished by rotating the focusing ring on the lens. In the AF (auto-focusing) mode, when the shutter-release button is slightly depressed, the lens will automatically focus on whatever is within the selected focusing brackets in the viewfinder. The camera will maintain this same focus as long as the shutter-release button is lightly depressed. If the subject moves, or if the photographer changes his position, the shutter-release button must be lightly pressed again to refocus. DINfos students will set the camera on the M (manual) focus mode for all activities in this course.

- **Auto-focus assist lamp** – When the camera is in auto-focus (AF) mode and under certain other camera settings, this lamp helps the camera focus when the subject is poorly lit. Since your camera will be on the manual focus mode in this course, you will not be using this control.
Front view of the Nikon D70

Sub-command dial
Shutter-release button
Auto-focus (AF) assist lamp
Depth-of-field preview button
Lens-release button
Focus-mode selector
Rear view controls (left side)
(Refer to the diagram, “Rear view of the Nikon D70 – left side”)

- **Shooting mode button / Format button** – This button accomplishes two distinct operations: selection of a shooting mode, which determines how the camera takes photographs, and formatting of the memory card. The D70 has four possible shooting modes: single frame, continuous, self-timer, delayed remote and quick-response. For all activities in this course, DINFOS students will set the camera to S (single frame) shooting mode to take one photo each time the shutter-release button is fully pressed.

- **Bracketing button** – Used primarily in challenging light situations and only in the M, A, S or P exposure modes on the Nikon D70, bracketing allows the camera to take three consecutive shots with slight variations in settings. This button is not used in this course.

Rear view of the Nikon D70 - left side
• **Viewfinder** – The viewfinder is the small window through which you look to compose photos. It allows you to see 96 percent of the area the lens “sees.” The viewfinder information bar (depicted below) provides essential, such as shutter speed and f/stop. It also includes the light meter.

![Viewfinder Information Bar](image)

• **Playback button** – Pressing this button once allows the most recent photograph to be displayed on the monitor. To view additional photographs, use the multi selector cursor located on the rear right side of the D70 to view the photographs. The playback button is also used to help manage other activities related to storing images on the memory card.

• **Menu button** – Pressing this button provides access to the different menus displayed on the monitor in which various settings can be selected for various camera functions. The D70 has four main menus: the shooting menu, playback menu, custom settings menu and the setup menu.

• **Sensitivity (ISO) button** – “Sensitivity,” which is the digital equivalent of film speed, refers to the CCD’s sensitivity to light. The higher the sensitivity, the less light needed to make an exposure. This button allows you to control this function on the camera. DINFOS students will keep the ISO set to 200 or 400 for all activities in this course, except in situations, such as low light conditions, when ISO can be changed as designated/approved by instructor.

• **White balance button** – White balance is the process of making internal camera adjustments for the color of the light source. The D70 white balance button allows for several different settings, such as auto, incandescent and fluorescent. Auto is recommended for most lighting situations. In auto, white balance adjusts automatically based on color temperature. DINFOS students will keep the white balance set to A (auto) for all activities in this course.

• **Image quality / Image size button** – This button allows you to change image quality and image size on the camera. Together, image quality and image size determine how much space each photograph occupies on the memory card. DINFOS students will set the image quality at basic (BASIC) and image size at small (S) (or equivalent) for all activities in this course.

• **Monitor** – This LCD display is used to view images and menu functions, such as ISO, image quality, white balance, etc.
Rear view controls (right side)
(Refer to the diagram, "Rear view of the Nikon D70 – right side")

- **Main command dial (or often simply, the command dial)**
  - Located near your thumb as you’re holding the camera, just below the control panel (so it can be easily rotated), this dial’s primary function is to control the camera’s shutter speed, which can be viewed both on the control panel and through the viewfinder. Shutter speeds for the Nikon D70 range from “bulb” to maximum 1/8000th second. When used in conjunction with other controls, the main command dial can also be used to change other settings, such as exposure mode, metering mode, etc.

  **Important note about shutter speeds in BPASC-ADL:**
  Do not use a shutter speed below 1/60th in this course. Shutter speeds below 1/60th (when used without a tripod) can show camera shake, rendering your photos unusable.

- **AE/AF lock button**
  - This button will lock both exposure and focus settings when used in automatic settings. This button is not used in this course.

- **Diopter adjustment control**
  - This graduated lever control allows you to adjust, albeit very slightly, the viewfinder’s focus to match closer to your own vision, but it only makes very minor tweaks. It cannot replace the need for glasses or contacts.

- **Multi selector**
  - This round device’s “built-in” up, down, left and right cursors are used to navigate through the camera menus that are displayed on the monitor.

  **Focus selector lock**
  - This control, when in the unlocked position (•), works with the multi selector to select up to five different focus areas on the subject. The locked position (L) “locks in” the selected focus area while you are taking an exposure. DINFOS students will set the camera to L (locked position) for all shooting activities in this course, but the control needs to be in the unlocked (•) position in order to use the multi selector to navigate through the camera’s menus.

- **Delete button**
  - Pressing this button twice -- once to delete, then another time to confirm delete -- allows you to delete the photograph displayed on the monitor.

- **Memory card slot cover**
  - Protects the card slot and card when inserted from dirt and debris.

- **Memory card slot cover latch**
  - Pressing this latch releases the lock on the cover to in order to insert or remove the memory card. Note: The memory card should only be removed when the camera is off.
Rear view of the Nikon D70 - right side
Assembly

Your camera has very delicate parts, so you must exercise care when assembling it. Assembly includes battery insertion/removal, compact flash card (memory card) insertion/removal and lens mounting/dismounting.

Battery insertion/removal - The battery compartment door is located in the bottom of the camera’s handgrip. The camera requires a charged battery or AC adapter in order to function. You must ensure the camera is in the OFF position before inserting or removing the battery. Release the latch on the battery door and slide the battery in with the connection points entering first.

Compact flash card insertion and removal - With the camera in the OFF position, unlatch the memory card slot cover (door). With the back side of the card and the pin slots first, GENTLY slide the card into place until the grey button pops out. Do not force the card in, or the connector pins will break, rendering both card and camera useless. To remove the card, gently push the grey button until the card pops out of place, then slide the card out the rest of the way and close the door.

Lens mounting/dismounting - To mount the lens onto the camera, place the lens in the camera ensuring that the white dot on the lens aligns with the white dot on the camera. Rotate the lens counterclockwise away from the lens release button until it locks into place and an audible click is heard. To dismount the lens, press and hold the lens-release button while rotating the lens clockwise toward the lens-release button. Gently lift the lens from its seated position. To prevent damage to the insides of the camera, you should always have a lens mounted on the camera.
Setup

Setting up your camera includes formatting your memory card, establishing the course's mandatory camera settings for exposure mode, metering mode, focus mode, shooting mode, white balance, image quality and image size, locking or unlocking the focus selector, and adjusting the diopter, if necessary. Keep in mind while taking photographs in the manual (M) exposure mode, the only mode you will use in this course), you will also need to adjust the following three settings depending on your shoot: sensitivity (ISO), aperture (f/stop) and shutter speed.

Formatting compact flash card – Formatting a memory card versus simply erasing the images off a memory card permanently deletes any and all images and other data from the card, and in addition, improves the overall performance of the card because it recreates the card’s file system. Before formatting your memory card be sure to copy to a computer any photos and other data you wish to keep. Note: New memory cards do not need to be formatted.

- To format the card for the Nikon D70, turn the camera on, then press and hold both the LCD illuminator button (located to the right of the control panel (top LCD) and the shooting mode button (located to the left of the viewfinder on the rear of the camera) simultaneously until the term “FOR” appears in the control panel (top LCD) (about two seconds). Then, press both buttons together a second time to format card. Your frame count will return to the maximum number of exposures available on the card.

Listed below are the mandatory camera settings for this course (except where noted) and at least one way how you can make them on a Nikon D70.

Important Note: Refer to your camera’s manual to make these required settings on your camera, if different than the Nikon D70.

Exposure mode – M (manual) The camera can be on or off to make this setting. To set, rotate the mode dial (see top view diagram) to M. This setting allows to be able to change both aperture and shutter speed settings while shooting. For comparison, the A (aperture-priority auto) mode allows the user to manually set the aperture (f/stop) while the camera automatically adjusts the shutter speed; the S (shutter-priority auto) mode, allows the user to manually set the shutter speed while the camera automatically adjusts the aperture; and the P (program) mode automatically sets the shutter speed and aperture f/stop for average lighting situations.

Important Note: For all four exposure modes (P, S, A and M), ensure the auto-focus lens’ manual aperture ring (closest ring to body of camera on the camera lens) is set at smallest possible aperture setting, (meaning the largest number on the ring), or the error code, “FEE” will appear in the viewfinder and control panel (top LCD), and you will not be able to take a photograph.

Metering Mode – With the camera on and the exposure mode set to M (manual), hold down the metering mode button (see top view diagram) while rotating the main command dial (see right side rear view diagram) and looking at the control panel (top LCD), which will display the three different metering modes available on the
Nikon D70: Spot, which is used when a photographer wants to base the exposure on a very specific area of a scene, is indicated on the top LCD by a dot in a bracketed rectangle. Center-weighted, which is useful when a photographer wants to base the exposure on a single area in the scene, is indicated by a dot surrounded by what looks like parentheses in a bracketed rectangle. Matrix, the only metering mode you will use in this course, calculates the exposure of a shot based on everything the photographer sees in the viewfinder. Matrix is indicated on the top LCD by a dot surrounded by what looks like four “leaves” in a bracketed triangle.

Focus mode – M (manual) The camera can be on or off to make this setting. To set, move the focus-mode selector (see front view diagram) to the M position. In the M mode, the camera does not focus automatically, but must be adjusted manually by using the lens focusing ring (located on end of the lens furthest away from the camera body). By contrast, in the AF, or auto-focus, position, the camera focuses automatically.

Shooting mode – S (single frame) With the camera on, hold the shooting mode/format button (see left side rear view diagram) as you rotate the main command dial (see right side rear view diagram). Stop when you see in the control panel (top LCD) a small box with a “S” in it. The S mode allows you to take one photograph each time the shutter-release button is pressed.

White balance – A (auto) With the camera on and the exposure mode set to M (manual), hold down the white balance button (see left side rear view diagram) while rotating the main command dial (see right side rear view diagram) until the A appears in the control panel (top LCD) next to the letters “WB”. In the A setting, the camera will automatically adjust the colors in the exposure to help make white objects appear white despite the light conditions in the scene. This setting can also be adjusted through the monitor (rear LCD) using the menu button and multi-selector, similar to the explanation under “Image quality” below.

**Image quality** – BASIC (basic) and **Image size** – S (small) As with many of the camera settings, such as white balance and sensitivity (ISO), adjustments can be made a few different ways.

- To set the image quality and image size through the monitor (rear LCD): With the camera on, hit the menu button (see left side rear view diagram) to turn on the monitor. With the multi selector (see right side rear view diagram), ensure the camera icon is highlighted (in the far left column of the monitor), which represents the shooting menu of the camera. [If the camera icon is not highlighted, use the multiselector to move the cursor up, down, left or right, as appropriate, to reach the shooting menu.] Next, move the multi selector appropriately to scroll up or down to highlight “Image quality” in the menu listing. Hit the right cursor on the multi selector to select (open) the menu listing selections for image quality, then scroll up or down using the multi selector to highlight the “JPEG” setting, using the right cursor to select it. This should take you back to the menu listing that includes Image size. To set the image size, move the multi selector to scroll up or down to highlight “Image size.” Hit the right cursor to select (open) the menu listing selections for image quality.
size, then scroll up or down using the multi selector to highlight the “S” setting, using the right cursor to select it. When finished, you may turn the monitor off by hitting the menu button twice.

- To set the image quality through the control panel (top LCD): With the camera on, hold down the image quality/image size button (see left side rear view diagram) while rotating the main command dial (see right side rear view diagram) until “BASIC” appears in a box on the bottom left-hand corner of the control panel’s display.

- To set the image size through the control panel (top LCD): With the camera on, hold down the image quality/image size button (see left side rear view diagram) while rotating the sub command dial (see front view diagram) until “S” appears in a box on the bottom left-hand corner of the display next to the image quality box.

**Focus selector lock** - L (locked) position (unless using menus) [You will be using the manual focus for all activities in this course.] To adjust this setting to the L (locked) position for all shooting activities, move the lever (see right side rear view diagram) to the “L” position. Move lever to the “•” (unlocked) position when using the menus on the monitor.

**Diopter adjustment control** (if needed) - To check if you need to make an adjustment to this lever, which is located directly next to the viewfinder (see right side rear view diagram), first set the camera on auto focus (AF) using the focus mode selector (see front view diagram), then aim the camera on something across the room (or away) from you, slightly depressing the shutter-release button until the camera’s auto focus function automatically adjusts the settings. Then, adjust the diopter control, moving the lever up or down, if necessary, to sharpen the image as you see it through the viewfinder.

The three settings on the camera that you will set yourself depending on the shoot are the sensitivity (ISO), aperture (f/stop) and shutter speed. These three settings are the primary factors in controlling how your exposures, or photographs, will turn out.

The combination of ISO rating, shutter speed and aperture setting helps control the light entering into the camera so you can capture the image you want, but most likely you don’t have to completely guess at what settings to use. Most digital cameras have an internal display that shows whether the photograph you’re about to take would be under- or over-exposed, and before your take the shot, you can change your settings accordingly. You’ll learn more about this display, called the “electronic analog exposure display” in the Nikon D70, or simply referred to as the “light meter,” and other details about taking properly exposed photographs in the Exposure Control lecture and related materials.

- **Sensitivity (ISO)** – The ISO setting, or rating, on a digital camera controls the charge-coupled device’s (CCD, or sensor) sensitivity to light. The higher the ISO rating, the higher the sensor’s sensitivity to light, and therefore the less light required in the scene for a good exposure. For this course, your camera’s sensitivity will usually be set at either 200 or 400 (unless you’re in very low-light
settings and as approved by your instructor). ISO 200 should be used for all bright daylight shots; ISO 400 should be used for cloudy, mildly overcast daylight shots (and, in addition, both can be used with flash photography).

To set the ISO rating: With the camera on, hold down the sensitivity (ISO) button (see left side rear view diagram) while rotating the main command dial (see the right side rear view diagram) until the “200” or “400” appears at the top left of the control panel (top LCD). [Note: The ISO rating and shutter speed appear in the same place on the control panel, with the ISO rating being displayed only while the sensitivity ISO button is pressed, and the shutter speed being displayed at all other times.] You can also set (or confirm) the ISO through the monitor (rear LCD) using the menu button and multi selector, similar to the way you set the image quality and image size settings.

- **Aperture (f/stop)** – The aperture, or often simply called “f/stop,” is the adjustable diaphragm in the camera lens that controls the amount, or intensity, of the light that is allowed to enter the camera. This diaphragm is calibrated in f/stop numbers, with a higher number indicating a smaller opening and vice versa. The f/stops on different lenses vary slightly: A Nikon 50mm lens ranges from 22 (smallest opening) to 1.8 (largest opening); on a Nikon 20mm lens, the f/stops range from 22 to 2.8. You will learn more in the coming lectures about what aperture setting to use in different shooting situations.

To adjust the aperture, rotate the sub-command dial (see top view diagram) until you reach the desired f/stop number, which is displayed in the top right-hand corner of the control panel.

- **Shutter speed** – Shutter speed is the physical speed at which the camera’s shutter, the two-curtained structure that opens and closes inside the camera, moves to control the amount of time a given quantity of light (controlled by the aperture) is allowed to enter the camera. On the Nikon D70, shutter speeds range from the slowest speed, “bulb,” to the quickest speed, 1/8000ths of a second, which is displayed as “8000” on the control panel. In this course, you will not go below a shutter speed of 1/60th of a second due to the potential of camera shake while in manual focus mode.

To adjust the shutter speed: With the camera on and the exposure mode on M (manual), rotate the main command dial (see right side rear view diagram) until you reach the desired shutter speed number, which is displayed in the top middle of the control panel (top LCD). [See note in Sensitivity (ISO) information on this page.]
Camera setup wrap-up

Required Nikon D70 camera settings for BPASC-ADL

Important Note: Refer to your camera’s manual to make these required settings on your camera, if different than the Nikon D70.

*Exposure mode: M (manual)

Metering mode: matrix metering

Focus mode: M (manual)

Shooting mode: S (single frame)

White balance: A (auto)

Image quality: BASIC

Image size: S (small)

Focus selector lock: L (locked) unless using menus on monitor

ISO: 200 or 400 (unless in low-light setting and approved by instructor)

* Important note: For all four exposure modes (P, S, A and M), ensure the auto-focus lens’ manual aperture ring (closest ring to body of camera on the camera lens) is set at smallest possible aperture setting, (meaning the largest number on the ring), or the error code, “FEE” will appear in the viewfinder and control panel (top LCD), and you will not be able to take a photograph.

Important note:
For this course, do not use a shutter speed below 1/60th of a second. Without a tripod, a shutter speed below 1/60th can show camera shake, rendering your images unusable.
Conclusion

Camera operation is the most critical step of photography. You will not be able to consistently produce good images if you do not understand how to operate your camera. The more familiar and knowledgeable you are with your equipment, the quicker and more confident you will become in your photographic skills.

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Nikon D70 owners manual

SB800 Flash Manual

BPASC Photojournalism Handbook (2009)