FIM 1801 - FUNDAMENTALS OF CINEMATOGRAPHY

The Camera Department
The number of members in the camera department will depend on the kind of film being shot. Big budget feature films will usually have a larger crew than a low budget film, commercial or music video. In the United States, the chain of command for the camera department is as follows:

Film Productions
- Director of Photography - D.P.
- Camera Operator
- First Assistant Camera - 1st AC (Focus Puller)
- Second Assistant Camera - 2nd AC (Clapper Loader)
- Film Loader (optional position on larger multi-camera productions)

The Director of Photography is the head of the department. Directly responsible to the Director of Photography is the Camera Operator. The 1st AC is directly responsible to the Camera Operator and the 2nd AC is directly responsible to the First Camera Assistant.

Director of Photography
The D.P. is the head of all technical departments on a film crew and is responsible for establishing how the script is translated into visual images based on the director’s request. The D.P. decides which camera, lenses, and film stock will be used for the production. The D.P. hires or recommends the Camera Operator and often also hires or recommends the 1st A.C. In many cases, mostly on non-union productions, the D.P. acts as Camera Operator, so that position will not be a part of the film crew. In hiring the 1st A.C., the D.P. usually bases the decision on past work experience and chooses someone he or she is comfortable working with. If that person is not available, the D.P. may ask for a recommendation from his or her usual 1st A.C. or a recommendation from another D.P.

The following are many of the responsibilities of the D.P.

Preproduction
- Reads the script so that he or she understands the story and has an idea of what may be involved in the shooting of the film
- Works with the Director, Production Designer, and Set Construction Supervisor to determine the look of the film and how the sets will be designed and constructed
- Assists the Director in translating the screenplay into visual images
- Attends production meetings to discuss the script and make any suggestions to help the production run smoothly
• Attends location scouts with the Director and any other production personnel to help determine the location’s suitability for filming, both aesthetically and from a practical production standpoint
• Chooses camera, lenses, filters, film stock, and any other camera equipment that may be needed
• Consults with 1st AC on any camera equipment or accessories that may be needed
• Recommends the camera rental house to use for renting equipment
• Recommends the grip and lighting equipment rental companies to use for renting equipment
• Recommends the laboratory that will process the film
• Discusses with the lab any anticipated special processing needs for the production
• Supervises any camera tests that may be necessary or arranges for them to be done
• Supervises any film tests that may be necessary or arranges for them to be done
• Supervises any lighting, costume, and makeup tests or arranges for them to be done
• Hires or recommends the members of the camera crew, the Gaffer, and the Key Grip
• Works closely with the Production Manager or Production Coordinator to determine the size of the camera, grip, and lighting crews
• Works with the grip and electric crews to determine the type and quantity of equipment needed for each department

Production
• Maintains the photographic quality and continuity of the production
• Sets the camera position, camera angle, and any camera movement for each shot based on the Director’s vision
• Oversees any photographic special effects shots in collaboration with the Effects Supervisor
• Selects the lens and filter(s) required for each shot
• Determines the correct exposure (t-stop) for each shot
• Works with the Director and Camera Operator when lining up and matching action and screen direction from shot to shot
• Works with the Camera Operator to set the composition for each shot based on the Director’s request
• Works with the DIT (Digital Imaging Technician) on a digital shoot to determine the overall look of each shot/scene.
• Determines if the shot will require a dolly or crane move
• Plans and supervises the lighting of all scenes, working closely with the Gaffer and the electrical crew
• Maintains the continuity of lighting from scene to scene
• Supervises the crews for all cameras in use on the production
• Supervises each technical crew while on stage or location
• Specifies the laboratory instructions for developing and processing of exposed film
• Views dailies with the Director and other production personnel
• Provides exposure meters and other necessary tools associated with performing the job
Postproduction
- Supervises the color timing of the final version of the film
- Supervises the transfer from film to videotape or digital medium

Camera Operator
The next person in line in the camera department is the Camera Operator. In the United States, the Camera Operator works closely with the D.P. to determine the composition for each shot as instructed by the director. In Britain, the Director and the Camera Operator work together to determine the placement of the camera and the composition of the shots. In Britain, the D.P., or Lighting Cameraman as he or she is sometimes called, deals primarily with the lighting of the set.

The primary job of the Camera Operator is to make smooth pan and tilt moves in order to maintain the composition of the subject. The Camera Operator keeps the action within the frame lines in order to tell the story.

The following are many of the responsibilities of the Camera Operator:

Preproduction
- Reads the script so that he or she understands the story and has an idea of what may be involved in the shooting of the film

Production
- Assures the proper operation of the fluid or gear head and similar equipment
- Adjusts the viewfinder diopter for his or her vision
- Adjusts the seat of the dolly for comfort and proper positioning prior to each shot
- Maintains the proper composition and framing as instructed by the Director or the DP
- Watches to make sure the proper eye lines and screen directions are maintained
- Makes smooth pan and tilt moves during each shot to maintain the proper composition
- Communicates clearly if the shot is acceptable; approves or disapproves each take after it is shot; certifies that no microphones, lights, stands, or other unwanted items were in the frame
- Works closely with the 1st AC to ensure proper focus, zoom moves, and t-stop settings for each shot
- Works closely with the 2nd AC regarding the proper size and placement of actors’ marks; if the marks are seen in the shot, informs the 2nd AC to make them smaller or remove them
- Notifies the 2nd AC when the camera has reached sync speed so that he or she may slate the shot
- Works closely with the Dolly Grip during rehearsals and takes to ensure smooth dolly or crane moves
- Works closely with the sound department to ensure proper placement of microphones during each take by telling them where the edges of the frame are located
- Works closely with Assistant Directors to ensure the proper placement of background actors and extras in the scene
- During rehearsals and takes ensures that crew members and equipment are not seen in any reflective surfaces seen in the shot
• May act as DP on any second unit shooting during the production
• Views dailies with the DP, Director, and other production personnel

**First Assistant Cameraman (1st A.C. or Focus Puller)**

**Preproduction**
• Knows and understands all professional motion picture camera equipment and accessories currently used in the industry
• Reads the script so that he or she is aware of the story and recommends any special equipment that he or she feels may be needed to carry out specific shots
• Works with the DP and/or Camera Operator to choose the camera equipment that will be used on the production
• Recommends the 2nd AC and Loader/Trainee to the DP and/or Production Manager
• Works with the 2nd AC to prepare a list of expendables, which is then given to the production office or Production Manager so that the items may be purchased
• Preps the camera package alone or along with the 2nd AC; ensures that all equipment is in proper working order

**Production**
• Responsible for the overall care and maintenance of all camera equipment during production
• Mounts the camera head onto the tripod, dolly, or other support piece and ensures that it is secure and working properly
• Unpacks, assembles, and warms up the camera and all of its components at the start of each shooting day
• Does not leave the camera unattended
• Loads and unloads proper film into the camera for the shots and setups
• Resets the footage counter to zero after each reload
• Resets the buckle switch in the camera if necessary
• Keeps all parts of the camera clean and free from dirt and dust, including camera body, lenses, filters, magazines, and so on
• Oils and lubes the camera as needed
• Sets the viewfinder eyepiece for each key person who will look through the camera
• Before each shot, ensures that the camera is level and balanced
• If the camera is mounted on a tripod, ensures that it is securely positioned and leveled
• When camera is in position for shooting, checks to be sure that no lights are kicking into the lens, causing a flare
• Places proper lens, filter, and any other accessory on the camera as instructed by the DP or Camera Operator
• Checks that lenses and filters are clean before filming
• Sets the t-stop on the lens before each take as instructed by the DP
• Measures the distances to subjects during rehearsals and marks the lens or focus marking disk
• Checks the depth of field for each shot as needed
• Follows focus and makes zoom lens moves during takes
• Adjusts the shutter angle, t-stop, or camera speed during a take as needed and as instructed by the DP
• If shooting digital knows and understands how to change/adjust settings in the camera menu including ISO, color temperature, shutter speed, fps, etc.
• Checks that camera is running at correct speed during filming
• Gives the 2nd AC footage readings from the camera after each take
• After each printed take or when instructed by the DP, checks the gate for hairs or emulsion buildup and requests another take if necessary
• Supervises the transportation and moving of all camera equipment between filming locations
• Works with the 2nd AC to move the camera to each new position
• Works with the 2nd AC to be sure that all camera batteries are kept fully charged and ready for use
• If there is no 2nd AC on the production, then also performs those duties
• Orders additional or special camera equipment as needed
• Checks call sheet daily to be sure any additional camera equipment and crew members are requested if needed
• Arranges for the return of any camera equipment no longer needed
• Arranges for the return and replacement of any damaged camera equipment
• Oversees all aspects of the camera department
• Disassembles the camera and its components at the completion of the shooting day and packs them away into the appropriate cases
• Provides all the necessary tools and accessories associated with performing the job

Postproduction
• At the completion of filming, cleans and wraps all camera equipment for returning to the rental house
• Views dailies with the DP, Director, and other production personnel

Second Assistant Cameraman (2nd AC or Clapper/Loader)

Preproduction
• On film shoots obtains a supply of empty cans, black bags, camera reports, and cores from the lab or asks the production office to arrange this
• Prepares a list of expendable with the 1st AC
• Prepares the camera package along with the 1st AC
• Cleans the camera truck and/or darkroom for use during the production and ensures that each is loaded with the proper supplies and equipment
• Loads and unloads film in the magazines and places proper identification on each if there is no Loader
• Prepares media cards and labels for each when working in digital
Production

- Checks with Loader (if there is one) to be sure that all film magazines are loaded and properly labeled
- Loads and unloads film in the magazines and places proper identification on each if there is no Loader
- Checks darkroom, if necessary, on a daily basis to be sure that it is lightproof
- Communicates with the Script Supervisor to obtain the scene and take numbers for each shot and also which takes are to be printed
- Records all information on the slate
- Records all information on the camera reports
- Checks with the Script Supervisor as to what takes are to be printed for each scene
- Helps to set up the camera at the start of each shooting day
- Marks the position of actors during the rehearsals
- Slates each scene, whether sound (sync) or silent (MOS)
- Assists in changing lenses, filters, magazines, and so on, and in moving the camera to each new position
- Sets up and moves the video monitor for each new camera setup and makes sure the cable is connected to the film camera
- Prepares exposed film for delivery to the lab and delivers it to the production company representative at the end of each shooting day
- Prepares exposed media cards for download
- When working in digital, works closely with post production to be sure that all footage is properly downloaded before formatting and re-using hard drives and/or media cards
- Cans and labels any film recans or short ends
- Serves as camera department contact with production office, film laboratory, camera equipment rental house and post production staff of the production
- Maintains a record of all film received, film shot, short ends created, and film on hand at the end of each shooting day during the production
- Maintains an inventory of film stock and expendables on hand and requests additional film stock and supplies from the production office as needed
- Maintains an inventory of camera equipment on hand, additional equipment ordered, and any equipment that has been damaged or returned
- Distributes copies of the camera reports and film inventory forms to the appropriate departments
- Keeps a file of all paperwork relating to the camera department during the production: camera reports, daily film inventory forms, processing reports from the lab, equipment packing lists, expendable requests, etc.
- Keeps a record of all hours worked by the camera department and prepares time sheets at the end of each day
- Performs the job of 1st AC, if necessary, in the absence of the 1st AC or when additional cameras are used
- Works with the 1st AC to move the camera to each new position
• Works with the 1st AC to ensure that all camera batteries are kept fully charged and ready for use
• At the end of each shooting day, helps the 1st AC pack away all camera equipment in a safe place

Postproduction
• At the completion of filming, helps the 1st AC clean and wrap all camera equipment for return to the rental house
• At the completion of filming, cleans and wraps the camera truck
• Provides all the necessary tools and accessories associated with performing the job

Loader

Preproduction
• May obtain a supply of empty cans, black bags, camera reports, and cores from the lab or asks the production office to arrange this
• Prepares a list of expendable with the 2nd AC
• Cleans the darkroom for use during the production and ensures that it is loaded with the proper supplies and equipment

Production
• Maintains an inventory of all film stock initially received from the production company
• Maintains a record of all film received, film shot, short ends created, and film on hand at the end of each shooting day during the production
• Keeps a file of all paperwork relating to the camera department during the production: camera reports, daily film inventory forms, processing reports from the lab, equipment packing lists, expendable requests, etc.
• Keeps a record of all hours worked by the camera department and prepares time cards at the end of each day or week
• Checks darkroom, if necessary, on a daily basis to be sure that it is lightproof
• Loads and unloads all film magazines during the course of filming
• Properly labels all loaded film magazines, cans of exposed film and short ends, and recans of unexposed film
• Prepares exposed film for delivery to the lab and delivers it to the production company representative at the end of each shooting day
• Distributes copies of the camera reports and film inventory forms to the appropriate departments
Digital Productions
In addition to the preceding positions, the following positions may be found on a production that is shooting in the digital format:
- Digital Imaging Technician (DIT)
- Video Controller
- Camera Utility
- Digital Utility
- Digital Loader/Data Manager

Digital Imaging Technician (DIT)
- Creates the equipment package for the production based on stage or location, how the show will be presented, and who will be using the equipment (film or video oriented)
- Should know each piece of equipment, how it works, and how to troubleshoot each part of the system by making recommendations regarding repair options; he or she should not be expected to repair equipment
- Preps, tests, sets up, operates, and maintains digital cameras, monitors, cables, recording devices, and other related equipment
- Should be able to make recommendations regarding options available whenever a piece of equipment goes down, but should not be expected to repair equipment
- Should know how to match the color on two or more cameras and maintain the look of the cameras if a Video Controller is not on the production
- Should understand and be able to perform shading operations that relate to gamma, gain, iris, RGB, white and black balance, detail/enhancement, matrix, and knee
- Should know and understand the internal camera menus and functions of various cameras
- Must understand and know how to read a waveform monitor and vectorscope and know how to interpret the values to the DP in “film” terminology that he or she can understand
- Verifies that audio is being recorded onto the camcorder, videotape recorder, or other recording medium
- Should know the production’s entire postproduction path and how it will be finally delivered when completed
- Make recommendations on postproduction facilities and other technical issues to keep the postproduction path as smooth and uneventful as possible
- Should establish a creative relationship with the DP so that he or she can set the color of the cameras, often before the DP asks for a specific change
- Looks out for the DP’s best interest in terms of understanding what the camera package can and cannot accomplish to fulfill the DP’s and the Director’s vision
- Oversees the use of any down-converters (HD to other formats)
Video Controller
• Matches or shades multiple cameras to each other so that a consistent look is maintained throughout the production
• Should be knowledgeable on every master control/shading system in use for video and HD production, including video trucks, control room installations, and handheld camera control devices
• Should be knowledgeable on the NTSC system so that changes to cameras are broadcast legal
• Should be up to date on all waveform monitors and vectorscopes and be able to read and calibrate each of them
• Should attend the setup and prep session for the equipment that will be used
• Should be able to match a minimum of four cameras without the use of charts after the initial setup of the cameras, including but not limited to gamma, gain, iris, RGB white balance, RGB black balance
• Will listen to the Director or Technical Director and match or shade a camera before it is switched for live broadcast or live recording
• For sitcoms, should match all cameras during rehearsals and will make only fine changes during shooting
• Should know what the broadcasters and production companies expect in the look of their shows
• In many cases, the DIT performs the duties of the Video Controller

Camera Utility
The Camera Utility is primarily found on television shows, sitcoms, and multi-camera feature films. He or she has various responsibilities depending on the type of production. Some of those responsibilities are listed here:

• Assists DIT or Video Controller in the setup of the camera
• Wrangles the many cables connecting the camera to the sound equipment, video recorders, and monitors
• Assembles each camera system and knows how to maintain proper pressure of the pneumatic camera pedestals
• Has a knowledge and understanding of multiple video formats
• On sitcoms, places marks for actors if no 2nd AC is on the production
• Switches media cards as needed if no 2nd AC is on the production
• Keeps camera reports and inventory sheets if no 2nd AC is on the production
• If shooting on a tape based camera, records bars and tone on a few tapes before the day’s shooting begins
• Assists the DIT in any manner needed, including the setup and connection of all equipment
• Should be knowledgeable on the setup of each piece of gear being used and how each piece is connected and integrates with other pieces of equipment
Digital Utility
The Digital Utility is often an additional position not found on all productions. Many of the duties are the same as those of the Camera Utility. Some of those responsibilities are listed here:

- Wrangles the many cables connecting the camera to the sound equipment, video recorders, and monitors
- Assembles each camera system and knows how to maintain proper pressure of the pneumatic camera pedestals
- On sitcoms, places marks for actors if no 2nd AC is on the production
- Switches media cards as needed if no 2nd AC is on the production
- Keeps camera reports and inventory sheets if no 2nd AC is on the production
- If shooting on a tape based camera, records bars and tone on a few tapes before the day’s shooting begins
- Assists the DIT in any manner needed, including the setup and connection of all equipment
- Should be knowledgeable on the setup of each piece of gear being used and how each piece is connected and integrates with other pieces of equipment

Digital Loader/Data Manager
The Digital Loader like the Film Loader may not be included on all digital productions. Their responsibilities are much the same as the film loader but instead of loading film they are dealing with digital data. Sometimes this position is referred to as Data Manager.

- Maintains an inventory of all media cards, hard drives and other media onto which the project is being recorded
- Maintains a record of all clips recorded and which cards, drives or media they were recorded onto
- Works with the DIT or post production to be sure that all media is properly downloaded and reviewed before cards/drives are reformatted for future use
- Properly labels all media cards, hard drives and other media
- Prepares media cards and hard drives for delivery to post production for downloading either during the day or at the end of the shooting day
- Provides all the necessary tools and accessories associated with performing the job