

## CINEMATOGRAPHY KNOWLEDGE BASE

For Internal Reference Only - v1.0

### 1. CAMERA FUNDAMENTALS

#### 1.1. Exposure Triangle

- **Aperture (T-Stop/F-Stop):** Controls the amount of light entering the lens.
  - *Low f-number (f/1.8):* More light, shallow depth of field (blurry background).
  - *High f-number (f/16):* Less light, deep depth of field (everything in focus).
- **ISO (Gain):** The sensor's sensitivity to light.
  - *Low ISO (100-800):* Clean image, less noise, requires more light.
  - *High ISO (3200+):* Brighter image in dark scenes, introduces digital noise/grain.
- **Shutter Angle/Speed:** Controls motion blur.
  - *Standard (180° Rule):* Shutter speed =  $1 / (2 \times \text{Frame Rate})$ . Creates natural motion blur.
  - *High Shutter (45° or 1/1000):* Staccato, crisp motion (e.g., *Saving Private Ryan* battle scenes).
  - *Slow Shutter (360°):* Dreamy, trailing motion blur (e.g., *Chungking Express*).

#### 1.2. Frame Rates (FPS)

- **24 fps:** Standard cinematic look.
- **30 fps:** Broadcast TV/News standard (NTSC).
- **60 fps:** Smooth motion, reality TV, sports, or gaming.
- **120 fps+:** Used for slow-motion playback.

### 2. LENSES & OPTICS

#### 2.1. Focal Length

- **Wide Angle (14mm - 35mm):** Expands space, exaggerates distance between subjects. Distorts faces close up.
- **Standard (50mm):** Closest to human eye perspective. Natural look.

- **Telephoto (85mm - 200mm+):** Compresses space (background looks closer). Flattering for portraits.

## 2.2. Types of Lenses

- **Prime:** Fixed focal length. Sharp, faster apertures (let in more light).
- **Zoom:** Variable focal length. Versatile, but often slower aperture (T2.8+).
- **Anamorphic:** Squeezes a wide image onto a standard sensor. Characteristics: Oval bokeh, horizontal lens flares, widescreen aspect ratio.

## 3. LIGHTING TECHNIQUES

### 3.1. Three-Point Lighting

1. **Key Light:** Primary light source, illuminating the subject.
2. **Fill Light:** Fills in shadows created by the key light (reduces contrast).
3. **Back Light (Rim/Hair Light):** Separates subject from the background by outlining them.

### 3.2. Lighting Quality

- **Hard Light:** Creates sharp, defined shadows. Source: Sun, naked bulb, Fresnel. Usage: Drama, Noir, tension.
- **Soft Light:** Wraps around the subject, soft shadows. Source: Softbox, diffusion frames, clouds. Usage: Beauty, interviews, naturalism.

### 3.3. Lighting Ratios

- **High Key:** Low contrast ratio (lots of fill). Bright, happy, comedy.
- **Low Key (Chiaroscuro):** High contrast ratio (little/no fill). Dramatic, moody, horror.

### 3.4. Color Temperature (Kelvin)

- **3200K:** Tungsten (Warm/Orange/Indoor light).
- **5600K:** Daylight (Cool/Blue/Outdoor light).
- **CTB / CTO:** Gels used to correct Tungsten to Blue (CTB) or Daylight to Orange (CTO).

## 4. SHOT COMPOSITION & FRAMING

### 4.1. Shot Sizes

- **Wide Shot (WS):** Establishes location and subject's relation to environment.
- **Full Shot (FS):** Subject visible from head to toe.
- **Medium Shot (MS):** Waist up. Standard for dialogue.
- **Close-Up (CU):** Head and shoulders. Captures emotion.
- **Extreme Close-Up (ECU):** Focuses on a specific detail (eye, hand, object).

#### **4.2. Composition Rules**

- **Rule of Thirds:** Frame divided into a 3x3 grid. Points of interest placed at intersections.
- **Leading Lines:** Lines in the environment (roads, fences) that guide the eye to the subject.
- **Headroom:** Space between top of subject's head and top of frame.
- **Look Room (Nose Room):** Space in front of the subject in the direction they are looking.

#### **4.3. Angles**

- **Low Angle:** Camera looks up. Makes subject look powerful or dominant.
- **High Angle:** Camera looks down. Makes subject look weak or vulnerable.
- **Dutch Angle:** Tilted horizon. Creates unease, disorientation, or chaos.

### **5. CAMERA MOVEMENT**

- **Pan:** Horizontal rotation (left/right) from a fixed point.
- **Tilt:** Vertical rotation (up/down) from a fixed point.
- **Dolly/Truck:** Physically moving the camera toward, away, or alongside the subject. Change in perspective (parallax).
- **Zoom:** Optical magnification change. No parallax change. Background doesn't shift relation to foreground.
- **Steadicam/Gimbal:** Smooth, floating movement following the subject.
- **Handheld:** Shaky, organic movement. Adds realism, urgency, or anxiety.

### **6. COLOR GRADING (POST-PRODUCTION)**

- **Log Profile:** A flat, desaturated image captured by the camera to preserve maximum dynamic range (detail in highlights and shadows). Needs grading.
- **LUT (Look Up Table):** A mathematical formula applied to footage to transform color space (e.g., Log to Rec.709) or apply a creative look.
- **Color Correction:** Fixing exposure, white balance, and matching shots.
- **Color Grading:** Applying a creative style or mood (e.g., the green tint in *The Matrix*).

## 7. ASPECT RATIOS

- **1.85:1:** Standard US Widescreen Cinema.
- **2.39:1 (Scope):** Ultra-widescreen, cinematic epic look.
- **16:9 (1.78:1):** Standard HDTV and Web.
- **4:3 (1.33:1):** Old TV standard, currently used for artistic/retro feel (e.g., *The Lighthouse*, *Grand Budapest Hotel*).