DIGITAL NEAR INFRARED PHOTOGRAPHY

WPS PROGRAM – ALBERT TANG
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COMPLETE LIGHT SPECTRUM

1. **10 – 380nm** ULTRA VIOLET LIGHT SPECTRUM
   (200 – 280nm SHORT UV, 280 – 320nm MEDIUM UV, 320 – 380nm LONG UV)
2. **380 - 730nm** VISIBLE LIGHT SPECTRUM
3. **730 – 1200nm** INFRARED LIGHT SPECTRUM
   (730 – 900nm NEAR INFRARED, 900 – 1200nm FAR INFRARED)
4. **6000 – 7200nm** THERMAL INFRARED

WAYS OF RENDERING NEAR INFRARED IMAGES

1. **INFRARED FILMS**
   EXPOSE INFRARED FILM, DEVELOP, SCAN NEGATIVE IN COMPUTER, AND USE PHOTSHOP TO ENHANCE**.**
   - KODAK HIGH SPEED INFRARED FILM : CODE HIE
   - ILFORD SP816T IR FILM
   - KONICA INFRARED 750

2. **DIGITAL RGB IMAGE MANIPULATION (PSEUDO IR)**
   - CAPTURE IMAGE USING **POLARIZING FILTER** TO DARKEN SKY.
   - USE **CHANNEL MIXER** IN PHOTOSHOP
     - GO TO IMAGE > ADJUSTMENT > CHANNEL MIXER
     - CHECK MONOCHROME BOX
     - PUSH RED CHANNEL TO + 200%. JUGGLE BLUE AND GREEN CHANNELS SO THAT THEIR SUM ROUGHLY EQUALS + 100% (FOR EXAMPLE : RED + 200%; GREEN - 40%; BLUE - 60%)
     - ADJUST LEVEL AND CURVE IF PICTURE LOOKS FLAT.
     - FILTER > NOISE > ADD NOISE IF DESIRED
     - FILTER > DISTORT > DIFFUSE GLOW AS NEEDED
     - SAVE IMAGE AS

3. **PHOTOSHOP PLUG-IN (PSEUDO IR)**
   EFFECT SIMULATES THE CHARACTERISTIC OF BRAND NAME INFRARED FILM AND/OR PHOTO PAPER
     - NIK COLOR EFEX PRO
     - PIXEL GENIUS PHOTOKIT COLOR
     - CHROMASOFTWARE IR FILM
     - CYBIA PSEUDO-IR
     - FRED MIRANDA

4. **DIGITAL CAMERA USING INFRARED FILTERS** : **HOYA R72** (ALMOST BLACK) OR **TIFFEN TI87** (NO VISIBLE LIGHT). CCD AND CMOS (NMOS) SENSORS CAPTURE COMPLETE LIGHT SPECTRUM FROM UV TO INFRARED. CAMERA MANUFACTURERS USE **" HOT FILTER "** TO BLOCK OUT THE INFRARED LIGHT TO GIVE BEST IMAGE IN THE VISIBLE LIGHT SPECTRUM.

   INFRARED LIGHT CAPTURES COLOR QUITE DIFFERENTLY :

   WHITE IS WHITE, GRAY IS GRAY, BLACK IS BLACK (NEUTRALS)

   GREENS ARE DIFFERENT SHADES OF WHITE,
   BLUES ARE DIFFERENT SHADES OF BLACK AND
   REDS ARE DIFFERENT SHADES OF GRAY.

   - **SHOOT IMAGES** IN ADOBE RGB COLOR
   - **CUSTOM WHITE BALANCE** WITH GREEN GRASS IMAGE. MANUAL FOCUS. BEST RESULT - USE SAME OR CLOSEST CAMERA SETTING FOR THE GREEN GRASS IMAGE AS THE INFRARED PHOTO.
   - **MINIMIZE MOTION BLURR** - USE MIRROR LOCK-UP, SELF TIMER OR REMOTE CABLE RELEASE, AND STURDY TRIPOD. AVOID WINDY DAYS.
   - USE **MANUAL MODE** . BRACKETING IS RECOMMENDED. WINTER SUN IS WEAKER – GIVE **1** F/STOP EXPOSURE MORE THAN SUMMER SUN.
   - **ISO** : 200, 400, 800 (LOWER ISO – LESSER NOISE)
   - **LENS** : SUPERWIDE (135 FORMAT : 24 - 28MM EQUIVALENT)
   - **APERTURE** : F/11, F/8, F/5.6 (F/8 GIVES BEST RESULT)
   - **SPEED** : 8, 6, 4 SECONDS (SHORTER TIME – LESSER NOISE)
   - **FOCUS** : **MANUALLY** – FOCUS DISTANCE IS CLOSER THAN ACTUAL – ADJUST DISTANCE TO RED MARK ON FOCUS RING OR **FOCUS AT THE NEAREST OBJECT**. USE ELECTRICIAL BLACK TAPE TO PREVENT DISTURBING THE **FOCUS RING SET-UP** AFTER FOCUSING. BELOW HELPFUL HYPERFOCAL DISTANCE CHART FOR DIGITAL SLR (1.6X FOV CROP) CALCULATED FOR AN 11" X 16" ENLARGEMENT :

F/STOP	50MM	35MM	28MM	24MM	20MM	17MM	15MM	12MM
F/11	54'	27'	17'	13'	9'	6'	5'	3'
F/8	**75'**	**37'**	**23'**	**17'**	**12'**	**9'**	**7'**	**4.5'**
F/5.6	107'	52'	34'	25'	17'	12'	10'	6'

   DOF IS FROM ½ OF THE HYPERFOCAL DISTANCE TO INFINITY.
   EXAMPLE : F/8 USING 17MM LENS – DOF WILL BE ½ OF 9' = 4.5'

TO INFINITY.

- **COVER UP** OPTICAL VIEWFINDER (**EYE PIECE**) TO AVOID STRAYED LIGHT DEGRADING THE IMAGE, ATTACH INFRARED FILTER ON LENS AND COVER THE **GAP** BETWEEN THE INFRARED FILTER AND LENS WITH **3/4" ELECTRICAL BLACK TAPE**.
- **PHOTO PAPERS** – ILFORD GALERIE SMOOTH FINE ART MATT PAPER AND EPSON WATERCOLOR MATT PAPER GIVE GOOD RESULTS.
- **PRINTERS** – EPSON PRINTERS WITH ULTRACHROME K3 INKS R2400, R4800, AND CANON i9900 PRINTER GIVE GOOD RESULTS.
- **MURKINESS** (MOISTURE IN AIR OR RELATIVE HUMIDITY) AFFECTS PICTURE CLARITY. LOW R.H. – CRISPY CLEAR. HIGH R.H. – FUZZY OR DREAMY.
- **FOLIAGE** – WILLOW TYPE TREES GIVES THE BEST WHITE TONE, CONIFERS GIVE THE DARKEST TONE.
- **SKY** – BEST IS CLEAR BLUE SKY WITH PUFFY CLOUDS. OVERCAST SKY IS DISSAPOINTING. INFRARED WILL PICK UP THE FAINTEST OF MOISTURE WHISKERS IN THE SKY.
- **LIGHT DIRECTION** - FRONTAL LIGHT GIVES BLACK SKY; 45 DEGREE SIDE LIGHT GIVES GRADUATING SKY FROM TOP BLACK TO LOW GRAY; 90 DEGREE SIDE LIGHT GIVES DULL GRAY SKY. BACKLIGHT GIVES ALMOST WHITE SKY.
- **WATER** – POOL, POND, OR ANY CALM WATER BODY WITHOUT RIPPLES AND GIVES REFLECTION IS IDEAL.
- **LIGHTING** – BEST TIME IS JUST AFTER THE MORNING GOLDEN HOURS FOR COLOR TO BEFORE NOON. AGAIN FROM 2:00PM TO BEFORE THE START OF GOLDEN HOURS FOR COLOR. NOON TO 2:00PM LIGHT IS TOO FLAT. GOLDEN HOURS FOR COLOR ARE TOO WEAK FOR INFRARED.
- **HUMAN SUBJECT** - INCREASING DEMAND FOR HIGH SCHOOL YEAR BOOKS AND WEDDING PICTURES DUE SKIN APPEARS MARBLE LIKE AND FREE FROM BLEMISHES. WATCH OUT FOR DARK – BLACK HOLLOW EYE SOCKETS. SUBJECT NEEDS TO LOOK AWAY FROM CAMERA. USE THE DODGE TOOL TO LIGHTEN BLACK EYE SOCKETS..
- **WORK FLOW** : IMAGE > ADJUSTMENT
    - HUE/SATURATION : DESATURATE –100%
    - CROP TO SIZE
    - INCREASE HORIZONTAL DIMENSION : USE IMAGE > CANVAS SIZE TO STRETCH
    - WIDE SCREEN LOOK : USE EDIT > TRANSFORM > FREE TRANSFORM AND DRAG SIDEWAYS

- LEVEL : SET BLACK AND WHITE POINTS
- CURVE : PULL CURVE AS NEEDED
- BRIGHTNESS/CONTRAST : SET AS NEEDED
- TOOL BAR : DODGE AND BURN
- FITLER > NOISE (ADD OR REDUCE AS NEEDED)
- FILTER > DISTORT > DIFFUSE GLOW (ADD AS NEEDED)
- IMAGE > IMAGE SIZE
- FILTER > SMART SHARPEN
- SAVE IMAGE AS

5. CAMERA CONVERSION

BY REMOVING THE " **HOT FILTER** " AND REPLACING IT WITH A WRATTEN W87 INFRARED FILTER. MAY NOT BE FOR EVERYONE.

* **PROS** – CAN ACHIEVE HANDHELD SPEED THUS ELIMINATING TRIPOD. ABLE TO SEE A RAW BLACK/WHITE IMAGE ON LCD.

* **CONS** – CONVERSION VOIDS CAMERA WARRANTY; COST OF CONVERSION IS HIGH BETWEEN $200.00 TO $500.00; WILL ONLY TAKE INFRARED PHOTO AFTER CONVERSION. SOME SERVICES WILL CHARGE HALF PRICE TO CONVERT BACK TO COLOR BUT THIS STILL VOIDS THE CAMERA WARRANTY.

LATEST INNOVATION – CONVERT DIGITAL CAMERA TO TAKE COMPLETE SPECTRUM PHOTOGRAPHY I.E. UV, VISIBLE LIGHT & INFRARED USING DIFFERENT EXTERNAL FILTERS.

HAVE FUN IN SHOOTING NEAR INFRARED IMAGES

WHAT IS THE SINGLE NATURAL ELEMENT THAT AFFECTS THE CLARITY OR THE MOOD OF AN IR PICTURE ?

NAME THE (3) GOOD USES OF ELECTRICAL BLACK TAPE WHEN TAKING IR PCITURES ?

HOW DOES INFRARED LIGHT REACT TO COLORS ?

DESCRIBE THE COMPLETE LIGHT SPECTRUM ?