BEGINNING DIGITAL PHOTOGRAPHY

STUDENT PACKET

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Ongoing Learning!
FREE!

YouTube
OBJECTIVES

- Learn the basics of digital photography and camera mechanics
- Understand the basics of pixels and how they work
- Understand the basics of photo compression and when to use it
- Understand the importance of file management and naming
- Photography tips for taking better photos (time allowing)
WE WILL NOT COVER

- Flash or strobe photography
- Macro (close-up) photography
- Proprietary controls & functionality of individual cameras
- Night photography, underwater photography, & other specific types
- Medium or large format photography
LIGHT IS CONTROLLED BY CAMERAS IN 3 BASIC WAYS

ALL 3 WORKING TOGETHER
1. APERTURE (F/Stop)
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NOTE: THE LARGER THE F STOP NUMBER THE SMALLER THE APERTURE OPENING!
CONTROLS AMOUNT OF LIGHT & DEPTH OF FIELD

F16  F10  F6.3  F3.5  F2  F1.4
2. FOCAL PLANE SHUTTER SPEED
FREEZES ACTION IN VARYING DEGREES

Shutter speed: 1/8
Shutter speed: 1/50
Shutter speed: 1/100
Shutter speed: 1/250
3. SENSOR SENSITIVITY (ISO)
ISO controls sensitivity to light.

Same shutter speed and aperture, different ISO:
- 100
- 200
- 400
- 800
**ISO - Sensitivity to Light**
- More Sensitive: Lower Quality
- Less Sensitive: Best Quality
- 6400, 3200, 1600, 800, 400, 200, 100, 50

**Shutter Speed**
- Slow: Snake and Blur
- Freeze Movement
- 1/1, 1/2, 1/3, 1/4, 1/5, 1/6, 1/8, 1/10, 1/15, 1/30

**Aperture – f/Stop**
- f/1.4
  - Shallow DOF, Less in focus
- f/2
- f/2.2
- f/2.9
- f/4
- f/5.6
- f/8
- f/11
- f/16
- f/22
- f/32
  - Deep DOF, More in focus

**EACH HAS PROS & CONS**

**Needs Less Light**
- Requires more light

**Needs More Light**
- Requires less light
FIND A GOOD BALANCE
But 1st determine your control element

- Target exposure
  - Shutter speed vs. ISO
  - High ISO vs. low ISO

- Aperture changed
  - Aperture (f-number) vs. Shutter speed

- Shutter speed changed
  - Shutter speed vs. ISO

- ISO changed
  - ISO vs. Shutter speed

Examples:
- Aperture: F/5.6  Shutter Speed: 1/400 sec.  ISO: 100
- Aperture: F/20  Shutter Speed: 1/125 sec.  ISO: 400
<table>
<thead>
<tr>
<th>ISO</th>
<th>F/Stop</th>
<th>Shutter Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>F/5.6</td>
<td>1/60</td>
</tr>
<tr>
<td>200</td>
<td>F/8</td>
<td>1/60</td>
</tr>
<tr>
<td>400</td>
<td>F/11</td>
<td>1/60</td>
</tr>
<tr>
<td>800</td>
<td>F/16</td>
<td>1/60</td>
</tr>
<tr>
<td>1600</td>
<td>F/22</td>
<td>1/60</td>
</tr>
<tr>
<td>3200</td>
<td>F/32</td>
<td>1/60</td>
</tr>
</tbody>
</table>

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<tr>
<th>ISO</th>
<th>F/Stop</th>
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<tr>
<td>100</td>
<td>F/5.6</td>
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</tr>
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<td>200</td>
<td>F/5.6</td>
<td>1/125</td>
</tr>
<tr>
<td>400</td>
<td>F/5.6</td>
<td>1/250</td>
</tr>
<tr>
<td>800</td>
<td>F/5.6</td>
<td>1/500</td>
</tr>
<tr>
<td>1600</td>
<td>F/5.6</td>
<td>1/1000</td>
</tr>
<tr>
<td>3200</td>
<td>F/5.6</td>
<td>1/2000</td>
</tr>
</tbody>
</table>
A word about
“Program Mode”

You choose shutter speed
camera automatically
chooses aperture
OR
You choose aperture
camera automatically
chooses shutter speed
Goal #2A = Controlling picture elements (Depth of field)

Portraits
Goal #2B = Controlling picture elements (Shutter speed)
Goal #2C = Controlling picture elements (Sensitivity / ISO)

Concerts & Theater
PIXELS

Picture = PIX
Element = EL
PIXELS

One Pixel

Picture = PIX
Element = EL
VIDEO
30 Frames / Second

Video Compression

Redundant data is dropped from frame to frame
JPEG Photo Compression

3 Pixels are very similar in color value
JPEG Photo Compression

Compression Algorithms

Less data is needed to create photo
JPEG Photo Compression

Highest Quality  High Quality  Medium Quality

Low Quality  Lowest Quality
# JPEG File Size Management

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Size in pixels</th>
<th>Purpose</th>
<th>Printed size</th>
<th>File size*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra Large</td>
<td>2592 x 1944 or larger</td>
<td>Large Print or poster</td>
<td>Larger than 8.5 x 11 inches 216 x 279 mm</td>
<td>High= 1.500K Med= 395K lov= 95K</td>
</tr>
<tr>
<td>Large</td>
<td>2048 x 1536</td>
<td>Large Print</td>
<td>8.5 x 11 inches 216 x 279 mm</td>
<td>High= 1.348K Med= 245K lov= 68K</td>
</tr>
<tr>
<td>Medium</td>
<td>1600 x 1200</td>
<td>Print postcard size</td>
<td>4.7 x 3.5 inches 119 x 89 mm</td>
<td>High= 877K Med= 160K lov= 48K</td>
</tr>
<tr>
<td>Small</td>
<td>640 x 480</td>
<td>Web and email</td>
<td>No larger than 2 x 15 inches 54 x 40 mm</td>
<td>High= 163K Med= 44K lov= 29K</td>
</tr>
</tbody>
</table>

1024 bytes = 1 KB  
1024 KB = 1 MB  
1024 MB = 1 GB  
1024 GB = 1 TB  
1024 TB = 1 PB
The detail an image holds
The higher the resolution
the more image detail
(think of resolution as
image quality)

An image that is 1600 pixels in width and 1200 pixels in height has a total of
$1600 \times 1200 = 1,920,000$ pixels or 1.9 megapixels

<table>
<thead>
<tr>
<th>Image Resolution</th>
<th>Maximum Print Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 640X480</td>
<td>Wallet size only</td>
</tr>
<tr>
<td>640X480</td>
<td>absolute largest, 4X6</td>
</tr>
<tr>
<td>1024X768</td>
<td>4X6</td>
</tr>
<tr>
<td>1152X864</td>
<td>5X7</td>
</tr>
<tr>
<td>1600X1200</td>
<td>8X10</td>
</tr>
</tbody>
</table>
Resizing Digital Photos
Resampling Digital Photos
PHOTO FILE MANAGEMENT
PHOTO FILE MANAGEMENT

Organize & Name Your Photo Files and Folders!
FREE Photo Editing Software for download.
RULE OF THIRDS

COMPOSITION

Place points of interest on intersections

Also use natural lines to lead the eye into the picture
phi grid
golden ratio
- Exposure tips for nature photography

- How to focus to infinity

- How to photograph Christmas lights

- How to photograph sunsets
  http://www.slrphotographyguide.com/tips/sunsets.shtml

- Beach photography tips
  http://www.slrphotographyguide.com/tips/beach-photography.shtml

- Smoke photography
  http://www.slrphotographyguide.com/blog/inspirational/smoke-art-photography.html

- Good reasons for using a lens hood

- Where to position the horizon line within a landscape photo

- Wildlife and animal photography tip

- How to photograph flying birds

- Photographing car light trails

- Dog photography tips

- Tips for photographing flying insects