CAMERA and EQUIPMENT:

General terminology:

ASA/ISO numbers – These numbers denote the speed or sensitivity of a film sensor. Higher numbers indicate greater sensitivity and allow for smaller f-stops and faster shutter speeds. ASA is the organizational abbreviation for the now defunct American Standard Association. ISO stands for International Standards Organization (incidentally, it also means equal).

Exposure – The amount of light that hits the film. One can control the exposure by controlling the shutter speed and aperture.

Depth of field – The range of distance that results in the sharpest photographic image. Depth of field is controlled by the possible aperture settings of a wide-variety of camera-types.

F-stop – Aperture size. Measured by approximately the f-stops of a larger number create smaller openings and greater depth of field.

Parallax error – The image deviation that results from viewing a stationary object from different angles. In photography the error can be corrected by using large-format cameras.

Shutter speed – The length of time a shutter is open. Measured in fractions of a second but notated as the denominator (1/400 is simply 400) with larger numbers denoting faster speeds.

Camera components:

Aperture – The adjustable opening in a camera lens that determines the amount of light that will hit the film, controlling depth of field or the sharpest portion of the image viewed through the lens.

Fixed-focus lenses – Permanently mounted lenses usually of 35mm focal length.

Lenses – An optical lens or series of lenses mounted to a camera to create images on film.

Lens focal lengths – Specified in millimeters (24mm, 35mm, 55mm, 135mm, etc.). The focal-length/film-size ratio determines the angle of view, or the total possible field of view. Lower focal lengths possess a wider angle and are used for architectural and landscape photography; higher focal lengths are used for portraiture and images of wildlife. Review the chart below for more detailed information.

Lens mount – The interface between the camera body and lens. Whether the camera is electric or mechanical, presence of a lens mount indicates that lenses can be used interchangeably.
Light meter – Measures the amount of light in a given scene to determine exposure setting. Light meters can be hand-held but are often built into the camera.

Shutter – Opens and closes at varying speeds to allow light to pass through to expose the film.

Shutter release – Used to open and close the shutter.

Additional equipment:

80A blue filter – This filter is used with daylight film to correct the orange/reddish cast of Tungsten lighting, effectively causing an indoor scene to appear as if it were lit by natural light.

Gray card – Used in tandem with the light meter to provide a standard reference for exposure that ensures consistent image results. These cards come in varying sizes and are calibrated at 18% reflectance. It is important to meter in the shadow with a gray card because it ensures the greatest capture of detail in shadow areas.

DEVELOPMENT

General terminology:

Contact print – A photographic image used as an easy visual index for your film, effectively a one-to-one reproduction of a filmstrip achieved by placing it directly onto photographic paper during exposure. This is achieved through the use of a contact printer, an exposure box used inside a dark room.
Emulsion – The gelatinous, chemically active surface of photography film or paper.

Emulsion speed – Dependent upon medium and exposure, emulsion speed refers to the amount of time it takes for the film emulsion to solidify and fix the image to photography film or paper.

Negative – During exposure the chemicals on film react and the captured image results in an inverse record of original color relationships. In the case of black and white film, the color is also converted to grayscale. Negatives are then developed using a negative process that reverses color or grayscale relationships whereby a positive image results.

Type of alternative processes performed in the School of Architecture Photo Union dark room:

Black-and-white or Monochrome photography – A four-step gelatin-silver development process. Developer solutions include alkali, a preservative and a restrainer each of which combines to convert silver halide in the film to metallic silver. A stop bath halts development by defusing the chemical reaction. Before drying, a fixer, either Ammonium- or Sodium-thiosulfate, is used to set the image and dissolve excess silver crystals. The film is then washed and can be coated with a wetting agent to aid in uniform drying. It is important to note that black and white photography is not limited to developing merely black and white prints. Shades of grey and sepia tones also result from this development process. Click here for black-and-white development instructions.

Cyanotype – A development process that results in a cyan-blue print. Cyanotypes are processed by combining Ammonium ferric citrate and Potassium ferricyanide and then exposing the film to ultraviolet light in order to produce a chemical reaction that results in Prussian Blue. Water is then used to develop the film rinsing excess blue from the print to create a positive image. The cyanotype process is also used to create blueprints.

Fiber print – A print made on fiber-based paper in contrast to resin-based, archival paper. Fiber prints require additional development time.

Liquid light – Similar to traditional development processes, liquid light is a quick process using silver nitrate emulsion. This liquid emulsion can coat a wide number of surfaces including wood, glass, ceramics, plastics, china, fabrics, metal, stone, paper, etc.

Polaroid emulsion lift – This alternative technique differs only slightly from standard development. Once the positive image is captured, the emulsion layer is removed from the film with hot water. The transparent
Film: Long narrow strips of chemical coated plastic

Film type – Width of film measured in millimeters.

Film perforations (perfs) – Holes that line film rolls to secure film in transportation and development.

16 mm – An inexpensive alternative to 35mm film. Typically used for amateur, educational and commercial filmmaking. Both single and double perforations exist for use.

35 mm – Basic film type employed for both still photography and motion pictures.

120 and 220 film – Roll films for still photography defined as ISO 732. At 144cm, the 220 is twice the length of the 120 but thinner due to the elimination of backing paper. As a result 220 may require a pressure plate to attain optimal focus.

Medium format – A film format that produces images larger then 24mm X 36mm, but smaller than 4" X 5". Medium format film produces images of higher resolution allowing for greater enlargement than small format film. Standard medium format film includes 120 and 220 film, with other types available for use in antique cameras.

Large format – Sheet and, sometimes, roll film used typically with view cameras. Standard sheet film sizes include 4"×5", 5"×7", 4"×10", 5"×12", 8"×10", 11"×14", 7"×17", 8"×20", 12"×20", 20"×24", and 30"×40". 120 film is occasionally used with a large format camera. Large format cameras are capable of exposing only half the film at any given time allowing for multiple prints (i.e. one 4"X5" becomes two 2"X5"s, one 8"X10", two 4"X10"s). Large format film is used to produce panoramic shots. In addition, using a large format camera will correct parallax error.

and malleable emulsion can be sculpted and grafted onto a number of two- and three-dimensional surfaces to produce different effects.

Pinhole camera prints – A pinhole camera is a very simple (often handmade) camera with no lens, a manual shutter (to accommodate prolonged exposure) and a small aperture that captures images through the same optic principles that govern human sight. Special processing in not required for pinhole prints.

http://en.wikipedia.org/wiki/Film_perforations
Super 8mm – This single-perforated film is an Eastman Kodak motion picture film format.

Tungsten film – Film designed to result in accurate color under Tungsten light. Tungsten film can also be employed to create unique color contrasts. ISO 64, 160, and 320 film speeds are standard for use with Tungsten film.

For information on development equipment and chemicals in the School of Architecture Photo Union dark room, review Developing and Printing Quick Reference and Chemical Mixing Room Plumbing Diagram.

<table>
<thead>
<tr>
<th>Quick Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>School of Architecture Photo Union dark room basic procedures (updated 01.31.2008)</td>
</tr>
</tbody>
</table>

### Film

<table>
<thead>
<tr>
<th>order</th>
<th>solution</th>
<th>mix proportion</th>
<th>time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D-76 Developer</td>
<td>1:1</td>
<td>dependent upon specific film (DO NOT open canister until film is fixed)</td>
</tr>
<tr>
<td>2</td>
<td>water (first rinse)</td>
<td></td>
<td>1 minute</td>
</tr>
<tr>
<td>3</td>
<td>Ilford Rapid Fix</td>
<td>straight</td>
<td>5 minutes</td>
</tr>
<tr>
<td>4</td>
<td>water (final wash)</td>
<td></td>
<td>10 minutes (pour continuously in and out of container)</td>
</tr>
<tr>
<td>5</td>
<td>Photo-Flo</td>
<td>one drop</td>
<td>1/2 minute +</td>
</tr>
</tbody>
</table>

### Paper

<table>
<thead>
<tr>
<th>order</th>
<th>solution</th>
<th>mix proportion (solution:water)</th>
<th>time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>working range</td>
</tr>
<tr>
<td>1</td>
<td>Dektol Developer</td>
<td>1:1</td>
<td>3/4 - 3 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3/4 - 4 minutes</td>
</tr>
<tr>
<td>2</td>
<td>stop bath</td>
<td>1:20</td>
<td>RC: 1/2 minute+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FB: 1 minute+</td>
</tr>
<tr>
<td>3</td>
<td>Ilford Rapid Fix</td>
<td>straight</td>
<td>RC: 1/2 minute</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FB: 1 minute</td>
</tr>
<tr>
<td>4</td>
<td>water (holding bath)</td>
<td></td>
<td>until all printing is complete</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RC: 30 minutes+</td>
</tr>
<tr>
<td>5</td>
<td>water (final wash)</td>
<td></td>
<td>FB: 60 minutes+</td>
</tr>
</tbody>
</table>
For cold water, turn 1, 4, 5, and 7 to the open position. To increase the temperature, turn 2 and 3 to the open position and decrease the flow of cold water by adjusting 4, 5, and 6 as needed. Make certain that 1 and 2 are fully closed when leaving.
GENERAL ADVICE – DIGITAL PHOTOGRAPHY

DPI (dots per inch) – Correlates with image resolution by governing the distance per inch between the dots of color that comprise a given image.

Printing from files – 300 DPI is a standard print format for digital image files.

Email size – 72 DPI is standard email format for digital image files.

Backing up photos – Make sure that all images are backed-up to an external hard-drive, server and/or CD. We’ve all heard the stories (if not experienced them) of portfolio work, group projects and study-abroad pictures disappearing in a moment of technological impotence. Be smart. Back-up.
RESOURCES:


http://www.cambridgeincolour.com/tutorials/camera-lenses.htm
http://www.dpreview.com/learn/?/key=focal+length
http://www.kodak.com/global/en/professional/support/techPubs/j78/j78.jhtml
http://www.nikonians.org/glossary.html
http://www.rockaloid.com/products.html

Instructional Video Series:

Introduction to Black and White Film Developing:

How to Develop Film:

How to Cut & Store Photo Contact Sheet:

How to Make a Print in Photography:
http://www.expertvillage.com/video-series/6538/how-make-print-photography.htm

Making Cyanotype Prints:

Antique Camera Guide: