Digital Photography 102

Introduction to
Digital Photography on Location
(Architecture and Architectural History)

combined with
Digital Photography in the Studio
(in the museum or photography facility)
How to Chose and Use a Digital Camera for photographing Architecture, Artifacts and Art

Mural size rollout print of Mayan urn taken by Nicholas Hellmuth and Tanja Rathjen, Museo Popol Vuh Universidad Francisco Marroquin.

Organized and delivered by **Nicholas Hellmuth, PhD, Director, Digital Imaging Resource Center, FLAAR-Latin America at UFM.**

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The course will be given in English; most of the lectures are available in written Spanish as well.

Target Audience

This course is appropriate as general background for entering digital photography as well as assistance for anyone who has already begun to do digital snapshots. For any level this course will lead you to better understanding of digital photography.

Architects and architectural students, photographers, art historians, artists (who wish to do fine art giclee printing), and archaeologists will find no other course like this available in the USA. This course is also excellent for real estate agents and anyone who needs to make quick and easy digital records of buildings or objects.

Excellent training for instructors who themselves wish to teach digital photography, digital imaging, or Adobe Photoshop for digital photography.

Appropriate for museum curators or any researcher who needs to survive in the world of digital photography.

You can be of any age. You do not need to be a "student" to take this course.

The difference between this 102 course and the 101 version is the 101 version is taught in Spanish at introductory level. 102 is taught in English at intermediate level.

Upper: print of art student. Lower; rollout print. Both samples were produced by the HP 5000

Course Abstract

If you want to learn how to do basic digital photography, what cameras are best (and which you should avoid), this course offers help, tips, and information. Provides help in making the transition to digital photography.

Course Content

The emphasis of this course is medium format and large format digital scan backs for studio photography, including product photography, museum photography, landscape photography, portrait photography, architectural photography, scientific photography, as well as photography of art of all sizes and shapes.

However very recently a new generation of 5 megapixel CCD sensor made it possible to accomplish basic large format inkjet printing with a point-and-shoot digital camera costing less than $1,000. Five years ago a camera of this nature would have cost $28,000.

This course is dedicated primarily to 35mm SLR digital cameras, medium-format backs and large format digital photography. But we realize that people also need to learn how to use the more economical zoom-lens cameras.

Thus we are now adding coverage of economical point-and-shoot digital cameras, but only at pro-sumer level, with the newest generation of 5 megapixel cameras as a starting point. Examples include Contax N Digital, Minolta DiMage 7i, Olympus E-20N, Nikon CoolPix 5000 and 5700 or equivalent Sony and Fuji models.

This is the only course at any university in the world which teaches both seamless panorama and circumferential rollout photography, probably because FLAAR is one of the few institutes in the world which owns both of these cameras.

Digital Camera

The participants do not have to own a camera. If they do not have one yet, they should wait until the course starts since we will discuss all the pros and cons of various makes and models. We will provide information to assist the students in their eventual choice.

FLAAR has several Nikon CoolPix cameras so you can learn the basics at introductory level. However most of the course will be taught with a BetterLight Super 6000 tri-linear scanning back studio system.

Students learning more about composition and the Bet-terLight system

Resource List

Textbooks

Most digital photography textbooks diverge from actual digital photography to discuss exclusively Adobe Photoshop. Thus, we will need to access several textbooks to select the portions that deal with cameras and the process of photography prior to importing the image into Adobe Photoshop.

In preparation for this course we have checked out dozens of different books (over 80 titles are available). We will have a concise list available. From that list we will select two books that focus on digital cameras, and two books that cover the aspects of Adobe Photoshop that are most applicable for editing digital camera output.

Once you sign up you will be provided lists of required, recommended, and suggested reading so that you can purchase these books in advance.

If you are paying the full price you will receive Nicholas Hellmuth's textbook on digital photography (alone, without the course, the 30 sections of this book sell for $300).

Brochures from the Camera and Printer Companies

In some instances, the brochures of manufacturers and/or distributors contain outstanding illustrations and informative text, and we will seek a reasonable means to show how you can obtain these booklets. For example, the literature of Rodenstock (large format lens company in Germany) is an example of a brochure that is as good as, if not better than, some textbooks.

There is a great booklet on color management which is also free.

Additional Course Information

Class Enrollment and Credit

New computer lab at UFM with capacity for 20 students.

It is not required that students have an affiliation with a college or university to enroll in this course.

However enrollment will be made through Universidad Francisco Marroquin (UFM).

So far, most of the people taking this course are non-students who seek the practical tips and training for their current job.

If you wish university credit, you can either receive it as Independent Study from where you are currently registered (if you are a student now). Or we can see if we can arrange credit from UFM.

Pre-requisites

You must have patience and interest in learning.

You must be able to use Internet search engines, and capable of using a PC. If you absolutely require a Macintosh, please bring a PowerBook. The university has a brand new lab filled with Dell computers but you can plug in your own Mac if you bring it.

You do not have to know Adobe Photoshop upon entering, but will need to learn the basics during the course. Adobe Photoshop is the international standard software for digital photography.

UFM will provide training and tutoring in basic Photoshop as a separate course at separate cost: $300 for beginners; $150 as brush-up course if you already know the basics.

Course Fee

Course is the same cost as the BGSU version, $800. The difference is that the UFM version is live and in person.

Sample Lectures "What you will Learn"

Digital photography: pros and cons

Understand why and in what aspects an original digital photograph may produce a better result on a large format printer than would a scanned negative (and vice-versa in other circumstances).

Why plunge into digital photography at all?
To prepare photos for use in graphic design for museum displays
To have photos for desktop publishing and reports
Create immersive QTVR images of rooms or buildings for use on the web
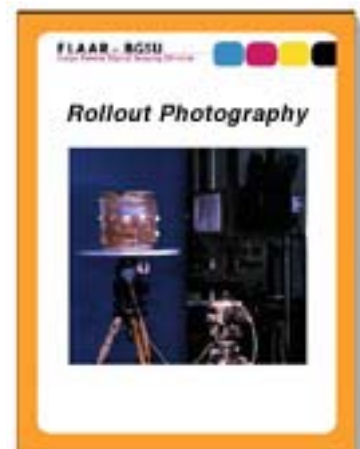
Create immersive imaging to spin individual objects in full 3D with QTVR object movies
To have personal control over the appearance of photos (rather than having some strange at a lab made decisions)
Record paintings in digital format so they can be reproduced as fine art giclee prints

Advantages of digital photography
No more smelly chemicals
No more cost of film
No more waiting for film to be developed: photos are instant
Creative freedom to shoot endless images
Ability to create photo montages for graphic design
Ability to print the images instantly with wide format inkjet
To send photos via e-mail while maintaining high quality
Easier to match colors of paintings and art work when you use digital imaging

Glossary

Introduction to digital jargon (so you too can understand every word and every concept).
Aliasing
Bits and bytes
CMYK, RGB
digital (as in digital vs analog)
Dpi = dots per inch but not pixels per inch
Dynamic range, density range
Grayscale = "black and white"
interpolation
lines per inch = lpi
noise (digital nose)
pixels = pixture elements
pixelization
ppi = pixels per inch and also samples-per-inch
resolution: lens resolution vs camera and print resolutions
and much more

History of digital photography

*   Time line of all the early digital cameras, invention of Photoshop, etc

How a digital camera actually works: CCD vs CMOS

*   What goes on inside a digital camera (presented in drawings and patiently explained).
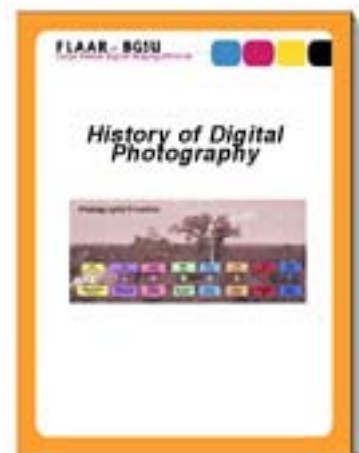*   CCD kind of sensor
*   CMOS kind of sensor
How it differs from CCD
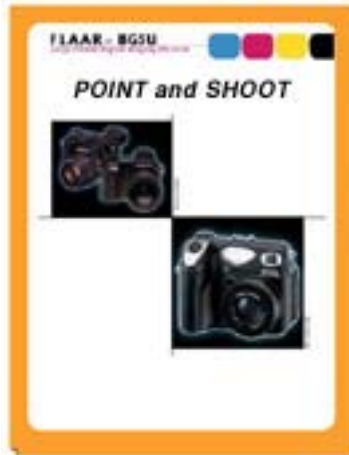Cheap CMOS cameras
mid-range CMOS cameras
single sensor medium format CMOS scan backs
RGB triple-sensor CMOS scan back system: Foveon

Types of digital cameras and which one(s) might be best for your needs

Point and shoot, entry level (we don't recommend these)
Point and shoot, 3 to 5 megapixels
SLR 35mm sized digital cameras: best buy nowadays
More sophisticated digital cameras are covered later in this course
Video: frame capture (resolution inadequate and hence not recommended)

Computer equipment you will need

General information on computers for digital imaging PC vs Mac, pros and cons of each. Will cover everything you need to learn about computers for digital imaging, from RAM to RAID. No previous experience required; it is out job to teach you.

Software which will help your digital photography

*   Nik, and all kinds of cool software that most people don't know about

Digital photography and printing image resolution

*   General observations on file size in digital imaging for printing
*   How to know what resolution you need for each kind of photography
*   Resizing an image
*   Camera resolution vs output resolution: dpi, lpi, ppi, meaning and implications
*   Output resolution for laser printers
*   Output resolution for normal inkjet printers
*   Output resolution for continuous tone digital printers
*   Output resolution for continuous tone dye sub printers
*   Compression techniques and jargon
*   Genuine Fractals software for enlarging small files to create large prints

Medium format digital backs for use with Hasselblad, etc.

*   One-shot such as PhaseOne
*   Multi-shot (2-shot, 3-shot, 4-shot) such as Imacon, Jenoptik, Sinar, Leaf

Large format digital (tri-linear) scanning backs for museums and fine art studios
*   Basic concept of a tri-linear scanning back
*   Tri-linear scanning backs: PhaseOne, BetterLight, Jobo, etc.

Cameras to hold your scan backs

Discussion of pros and cons of
Sinar, Linhof, Cambo, Toyo, Arca-Swiss
Wisner, other wooden 4x5 cameras

Lenses and Filters

*   Camera lenses
Macro lens for artifacts, biological samples, product photography
Telephoto lens
Wide angle lens
Pros and cons of wide angle large format lenses for architecture
Zoom lenses

*   Lens distortions
*   Camera lens Filters
Digital filters
Polarizing filters
Dust filters
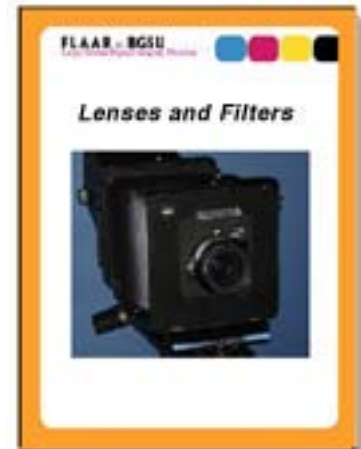
### Help in Selecting the digital camera which may be best for you and your needs

With the tips provided so far in learning about digital photography; now lets learn about the process of how to select the ideal digital camera for your particular needs.
Define your needs
Recognize your budget limitations
Compare and contrast digital capture technologies
Recognize the varying kinds of output and what kinds of input are needed
Review the camera options available today
Estimate whether you should buy today or still wait until tomorrow for the next generation (that day has passed; today plenty of choices are available already).

This course will teach you to be an expert in detecting hype in camera ads. For example, one camera manufacturer cheats and has misleading statistics when it describes its CCD and megapixel count.

Learning about lighting for digital photography

*   Natural light
*   General situation and problems; lighting for digital photography
*   Flash
Flash for entry level digital cameras: on-camera vs off-camera flash
Flash for 3 to 5 megapixel digital cameras
Fill flash
Reducing or eliminating red-eye from flash
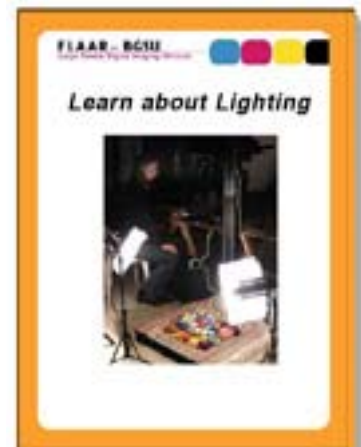
*   Lighting for medium format digital scan backs
*   Strobes (electronic flash)

*   Light stands
*   diffusers
*   Lighting for large format digital scanning backs
         Fluorescent lighting
         Tungsten lighting
         HMI lighting
*   power voltage regulation transformers for studio photogra-
phy

Studio photography for your facility: equipment

Camera stand (studio stand)
Tripods; tripod heads
Reprographic stand (copy stand)
Neat accessories

Equipment for QTVR and immersive images

Equipment for Object Movies (rotating an object in QTVR)

Improving your digital photography

*   What goes on inside a digital camera:
*   Selecting a shooting mode (for basic digital cameras),

Get better photos by taming your shutter
*   Automatic
*   Shutter priority
*   Aperture priority
*   Manual mode
Exposure and metering
Spot meter
Center-weighted meter
Other kinds of metering
ISO (used to be called ASA)
*   Exposure
How to avoid problems with too light or too dark
Exposure and noise reduction
Histograms as means of checking on exposure

Improve the color balance of your digital photographs
White balance (point and shoot*)*
gray balance (medium format and large format)

Focus and depth of field
*   Depth of field in museum and architectural photography
*   Reality of using digital cameras for your specific needs

Practical aspects

*   Batteries and battery chargers
*   Power conservation

Learning to live with downsides of digital cameras
*   Shutter lag
*   Recycle time
*   Initial boot time

Studio photography with digital cameras: subjects

Still life, objects
Flat work such as fine art
Circumferential rollout photography with BetterLight system.
Photographing people
Portraits or simply family and friends

Location photography with digital cameras

Landscapes
Panoramas
Seamless panoramas with BetterLight digital system
QTVR stitched panos.
Architecture
Perspective correction
Flora and fauna
Action photography (sports photography as an example)

Black and white digital photography, including fine art giclee

Tips on turning your reports into Adobe Acrobat PDF format

Tips on how to improve your PowerPoint presentations

Digital asset management: Archiving your images
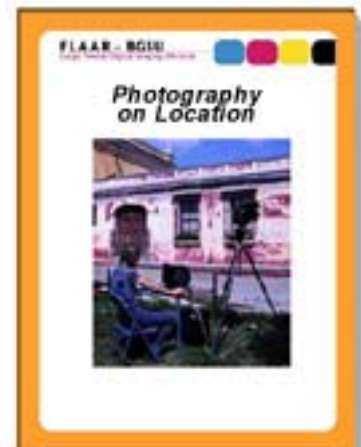
Software choices
Recommended software
Generating thumbnails
Generating contact prints

Sources and Resources

Complete glossary of digital photography, cameras, and digital imaging

Annotated bibliography of books

*   Includes table of contents of the more important titles on digital photography

Magazine articles

Recommended web sites

If you want this course info in Adobe Acrobat PDF format you can download the complete PDF version, full (long) version

How does this course differ from Digital Photography 101?
101 is in Spanish; 102 is in English.
102 is a tad more oriented to preparing digital images for printing on large format printers.
102 leads in to a course on actual wide format inkjet printing. However it is not required that you take this additional course.

You must either already thoroughly know Adobe Photoshop or sign up to take a brush up course or an introductory course here at UFM. No prior knowledge is required, but you do need to learn while you are here. We have plenty of instructors. UFM has version 7 installed in the computer lab.

FLAAR
Digital Imaging Resource Center

Click to view each FLAAR Network site

www.wide-format-printers.org	www.FineArtGicleePrinters.org	www.large-format-printers.org
www.digital-photography.org	www.flatbed-scanner-review.org	www.laser-printer-reviews.org
www.FLAAR.org	www.ctpid.ufm.edu.gt	www.wide-format-printers.net

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Course material will all be in English; however you can correspond en español oder auf Deutsch.

DIGITAL PHOTOGRAPHY

You will receive every one of these course units.

This abundant material (not available elsewhere) will provide you with all the experience of Nicholas Hellmuth to assist you in learning how to accomplish digital photography for your own needs and applications, at your own level, whether beginning, intermediate, or advanced