

SYLLABUS



MAKING SCIENCE AND ENGINEERING PICTURES

A PRACTICAL GUIDE TO PRESENTING YOUR WORK

Course Goals

This is an introductory level course. While previous experience with a camera will be helpful, it is not essential. Over our six weeks together, you will:

- learn to photograph your work with new perspectives
- develop methods and techniques that improve the quality of your images
- build critical thinking skills
- increase proficiency with a range of image making devices (scanners, cameras, smartphones, video)
- share and discuss your images with the instructional team and your peers
- discover how compelling images will reinforce and augment grant and journal submissions
- learn to evaluate what makes an effective image

Course Assignments

In order to complete the course assignments you will need access to a:

- single-lens reflex camera
- camera's software and cable to view images on computer (you will only need the camera and lens for weeks 2 and 3 of the course)
- 105 macro lens
- flatbed scanner
- tripod
- smartphone or tablet with camera

To complete each week's assignment, you will post your work to small VoiceThread (VT) groups and receive feedback on your images (when you first link out to VoiceThread you will be automatically sorted into those small groups). In order to take full advantage of the group work, you should complete each assignment within the designated week. Your course certificate

group work, you should complete each assignment within the designated week. Your course certificate will be awarded based on your VoiceThread activity.

Course Certificates

Completion certificates (honor code certificates or ID-verified) will be awarded to students who complete all VoiceThread assignments and the post-test found in week 6. In order to provide the opportunity to complete the VT assignments throughout the course, we will not tally up your VT work until the course ends on August 2. That means that you will not see progress appearing on your edX progress page as you make your way through the course.

WEEK 0: Getting Started

June 15, 2015

(#makepixwk0)

A gentle introduction to the course ahead with activities designed to introduce you to your tools, the instructional team, and each other.

Topics: Course goals, meet your peers, available resources, introduction to VoiceThread, peer review process, location of resources, and meet your instructional team.

Assignments:

- Introduce yourself in the Discussion Forum
- Consider and select a device or object that you will photograph throughout the course
- Take the pre-test to assess your existing photography knowledge

General Guidelines for Your Photos in This Course:

- Capture your camera or scanner images as TIFFs (not JPGs)
- Use the camera software to adjust camera settings and to download images to your computer
- Store your images in a separate folder on your computer (not in an intervening photo processing application like iPhoto).
- When you are ready to upload your images to VoiceThread, convert them first to JPGs

WEEK 1: Flatbed Scanner

This week we will use a flatbed scanner to create images. This is all about experimentation so have some fun and see what you can come up with.

Topics: Unique capabilities of flatbed scanners, resolution, backgrounds, 3D objects.

Course Videos:

Video 1: Using a flatbed scanner

Video 2: Placing objects on the scanner

Video 3: Transmitted and reflected light

Video 4: Enhancing the scanned image

Assignment:

- Scan your object
- Find an interesting detail in your resulting scan, zoom in on it and crop (using photo editing software) to create a new, detailed photo
- Scan your object, using two different overlays (backgrounds)
- Post all four images to VoiceThread and comment on the results
- Comment on the uploaded images of at least two others in your VT group

WEEK 2: Camera Basics

Here you will learn the important technical aspects of making successful photographs, and engage in a discussion on aesthetic decisions.

Topics:

The basics (depth of field, aperture setting, shutter speed), composition (perspective, angle, shadow, horizon line, orientation, whole/part, negative space, background), proper use of gear (tripod, laptop, camera).

Course Videos:

Video 5: Camera and lens

Video 6: Setting the exposure

Video 7: Aperture

Video 8: Composition

Video 9: Backgrounds

Video 10: Point of view

Interactive Tools

Interactive A: Aperture settings

Interactive B: Compare f-stops

Assignment:

- Take four images of your device at the following four aperture settings: f/4, f/8, f/22, f/32
- Once you've taken your four images, remove the camera from the tripod and take one more photo of your device at f/22 without the tripod
- Post the five images to VoiceThread and comment
- Comment on the uploaded images of at least two others in your VT group

WEEK 3: Light

The Greek roots of the word photography are “photos” (meaning light) and “graphé” (meaning “drawing”). Taken together, photography means “drawing with light”. In this week we will investigate light.

Topics:

Observe differences between various light sources (LED, tungsten, fluorescent, available light) as well as the effect of bounced light, shadows, and reflective/transmitted light.

Course Videos:

Video 11: An Introduction

Video 12: Fluorescence

Video 13: Use your imagination

Interactive Tools:

Interactive C: Fill light

Interactive D: Lighting gallery

Assignment:

- Find an image of a small object (in a magazine or online), scan or clip the image and upload to VT, use the drawing tools to indicate on the image where you think the light sources are positioned
- Take an image of your object in daylight, add a secondary light source, upload both images to VT, comment on the results
- Comment on the uploaded images of at least two others in your VT group

WEEK 4: Mobile Devices and Video

We'll be on the go this week with smartphone cameras and video.

Topics

Considerations when making pictures with mobile device cameras, and making video as an extension of still photography.

Course Videos:

Video 14: Using a smartphone

Video 15: Imaging with a tablet camera

Video 16: "Beautiful Chemistry"

Video 17: Looking at videos

Assignment:

- Take pictures of interesting/beautiful/unusual things over the course of one day with your smartphone; select the best two, upload them to VT
- Zoom in on a detail in one of the images and crop to create a new image, add it to the VT
- Create a micro-story video (no longer than 1 minute) that represents an event or process, upload your video to VT and describe your video's strengths and weaknesses in light of the still photography concepts in this course
- Comment on the photos and videos of at least two others in your VT group

WEEK 5: Presenting Your Work

Once you've captured a quality image of your device or object, there is still work to do. This week we will investigate how best to incorporate your pictures into figures for publication, and to use them as powerful means to speak with the public. In addition, an important component in this week will be a discussion of image enhancement—how far are we permitting to go when adjusting images in science?

Topics

Using your photographs in figures, showing scale, movement, and submitting for covers and homepages.

Live Event (July 21, 2015, 3:00 PM ET)

Kelly Krause, Art Director, Nature
MIT campus, Building 9, Room 151

Course Videos

Video 18: Creating figures

Video 19: Time and scale

Video 20: Cover submissions and homepage

Video 21: Image "enhancement"

Video 22: Speaking to the public

Assignment:

- Find an existing informational figure (that includes a photo) designed to explain (e.g. from a textbook, journal article, or manual). Scan or clip the image, upload to VT, and critique it.
- Create an informational figure of your own using one of the images you've taken in the course. Build two versions of your figure; one for a technical audience and one for the general public.

WEEK 6: Case Studies

This week we will examine unique visual challenges through a series of photographic cases. To wrap-up your course work, the teaching team will assemble a slideshow of the most effective student images submitted and discussed on VoiceThread.

Topics

An analysis of what we've learned over the preceding five weeks, and an in-depth look at specific photographic challenges.

Course Videos:

Video 23: Liquid battery

Video 24: Fuel cells for mobile batteries

Video 25: A solar thermophotovoltaic (STPV) system

Video 26: Microneedles

Video 27: Soft lithography

Video 28: Chemical vapor deposition

Video 29: Analytical microreactor

Video 30: Stretchable sensors

Video 31: Solar cell

MIT OpenCourseWare
<http://ocw.mit.edu>

Resource: Making Science and Engineering Pictures: A Practical Guide to Presenting Your Work
Felice Frankel

The following may not correspond to a particular course on MIT OpenCourseWare, but has been provided by the author as an individual learning resource.

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.