

Catalog Code:

Course Title: Intro to Experimental 3D

Department: FVNM 2015-002 (492)

Term/Year: Spring 2012

Course Credits: 3

Location & Time: 112 South Michigan, Room 714, Mon-Wed 6-9

Prerequisites: NONE

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Office Location: Left Rear, FVNMA Office, Fifth Floor, 112 S. Michigan Ave

Syllabus Version: 1/14/12

CLASS WEBSITE: <http://www.experimental3d.com/>

Regular use of the online discussion forum is mandatory for all students. Any changes to the syllabus and all assignments will be posted to the online discussion forum. Students are encouraged to take advantage of this 24-hour learning resource by posting and answering questions outside of class. Participation on the forum will be counted as participation in class, and like class participation is required to achieve credit at the semester's end. If you are quiet during class discussions, replying to posts on the online forum is another opportunity to satisfy your participation requirement. Starting discussions without meaningful replies will not count as participation.

Course Description

This class is inspired by Johannes Itten's radical early twentieth-century basic art course developed for the Weimar Bauhaus School of art and design in 1920, but now using the Maya 3D software, typically used to create commercial games and cartoon animations. Students will solve a series of formal problems, introduced in increasing levels of complexity. Moving from the 2-dimensional to the 3-dimensional and ultimately to the four-dimensional or time-based, students will evolve their abilities to utilize aspects of light and dark, form, rhythm, color, proportion and volume. In the process they will also learn the basics of the Maya 3D animation software. Student work from this class will become part of a special dvd collection included in the Joan Flasch Artist's Book Collection at the Flaxman Library.

Entry Requirements

It is highly recommended but not required that students be familiar with some

kind of digital graphic interface, such as Photoshop, or be otherwise digitally literate. The learning curve for all 3D software is very steep, and is particularly alienating in the first weeks of usage. If you are already computer saavy in a general way, this will soften the entry!

Students must expect to dedicate 4-6 hours per week in the beginning to homework and to spend time with the 4-disk Digital Tutors Introduction to Maya video demonstration series provided by the instructor.

Learning Maya is a bit like learning a foreign language or a musical instrument. It requires physical practice on a daily basis. It is not a program that is easily learned or “winged” at the last minute.

With this in mind, even a digital novice, if willing to spend the time required in the first weeks of class, can produce an interesting animation by the end of the semester, particularly because it's the form and the content that count.

Art can be made with Maya even using the most rudimentary tools. In fact, it is better to work one's way through the tools, and make visually sophisticated work at every phase of mastery. This will cultivate not only a sense of ease and familiarity with the software, but an ability to think laterally – meaning creatively – with it, which is what is particularly required at the most advanced levels of technical mastery.

Bibliography

Flaxman On Line Tutorials: Lyndas

<http://go.artic.edu/>

Academic Resources Quicklinks>Lynda.com software Training

Maya

Maya 2011 Creating Textures and Shaders

Maya 2011 Lighting and Rendering in mental ray

Maya 2011 Essential Training

Design and Form by Johannes Itten, The Basic Course at the Bauhaus and later. THIS BOOK IS REQUIRED!!!!

If you want to buy it, there are second-hand sellers that offer it for between

\$15.00 and \$20.00. I recommend it for your library. I got mine when I was your age, and I obviously still use it!

An Acrobat slider will be provided of visual highlights.

Other On-line Technical Resources

http://www.digitaltutors.com/digital_tutors/index.php

<http://www.thegnomonworkshop.com/tutorials.html>

<http://www.highend3d.com/>

<http://www.autodesk.com/>

<http://www.3dlinks.com/>

<http://www.3d-tutorial.com/>

WEEKLY CLASS SCHEDULE

After the first two classes, which have a strong historical and theoretical component, classes will be organized according to the split session: Mondays and Wednesdays. Mondays will be dedicated to presentation of homework, critique and workshops in which students problems with homework will be addressed. Wednesdays will be dedicated to the introduction of new material. Absence for one session counts as a full absence; more than 3 absences make for an automatic failure. The learning curve for the VR language is VERY STEEP. This means that the full attendance in the beginning is essential. Students will find that absences in the first 6 weeks will result in failure to learn for the rest of the semester! PLEASE MAKE NOTE!

Class 1.

MONDAY

1. Syllabus: A class inspired by the Bauhaus Basic Course by Johannes Itten .
2. The Real Fake: <http://www.real-fake.org/index.html>

The Real-Fake was an exhibition that I curated in collaboration with Rachel Clarke that presents the approaches employed by artists exploring artificial xyz space, the non-referenced synthetic image or object, and the

specific qualities of the virtual camera that records it. Its purpose is to position 3D computer graphics in the discursive context of contemporary art. The artists in the exhibit all use 3D software to create a range of art forms, from the still image to animation, interactive works and installation. All of them self-consciously place 3D within an avant-garde lexicon. Like their predecessors, video artists who adapted TV technologies for artistic use, these artists have adopted the technology employed in 3D shooter games and feature-length Hollywood animation blockbusters, but reject entertainment industry aesthetics and content, instead applying the medium to the trajectory of art history.

Their common strategy is to isolate and define a formal language native to the virtual. These formulations are then integrated into a variety of contemporary practices emerging from the discourses of media and of representation as they have impacted on photography, experimental film, and installation-based contemporary art. Their languages arise out of the painting traditions of figuration and abstraction, and artistic movements as wide ranging as Surrealism, Constructivism and Pop Art, as well as avant-garde cinema, post-Modern image making and experimental animation.

It is rare even in the new-media art context to find artists involved in contemporary practice that are deeply invested in exploring 3D computer art. The particular burden of the artists in *The Real-Fake* is to break away from the constraints imposed by the domination of an extremely fast-paced military/entertainment complex, beyond the commonly adopted strategy of appropriation. *The Real-Fake* proposes the potential of 3D computer art as the post-photography medium currently emerging from the new technologies and Zeitgeist of the early 21st century.

3. Navigational skills in Maya: the virtual camera and hot keys.
4. Menus (Polygons, Surfaces, Animation, Dynamics, Rendering).
5. Outliner and Attribute Editor.

WEDNESDAY

1. Translating, Rotating and Scaling. QWERTY
2. Setting up a shot: showing resolution gate; creating a bookmark (View>Bookmarks>Edit bookmarks> new bookmark).
3. Creating a project, saving a file: create a project and save your work as a progression of files. This project will serve as the basis for a series of in-class exercises
4. Creating a group: CntrlG
5. Duplicating: CntrlD
6. Choosing one of the still life prototypes provided as the basis, create a cubistic composition using only polygon cube primitives. Which have been translated, rotated, scaled

7. Render a frame (Click in Window, Render>Render Current Frame) default lighting and saving in your “images” subdirectory.



Homework

1. Using the same technical skills demonstrated in class, please create your own compositions inspired by the Bauhaus concept of oppositions. Don't copy the Bauhaus drawing but use the Maya tool in such a way that you exploit its qualities as a medium, meaning that it is a hybrid between photography, sculpture and painting. For your first assignment, create original compositions for the concepts “Point,” “Line,” “Plane” and “Volume” above. Render them as JPEGs and bring to class for a formal critique.

CLASS 2.

MONDAY

1. 9 AM-10 PM: Homework: display, critique and questions.
2. A short history of the Bauhaus

A Short History of the Bauhaus.



Bauhaus Group Portrait (Die Alten Bühnenleute), 1928 by T. Lux Feininger, 3 1/8" x 4" Vintage gelatin silver print from The Richard and Ellen Sandor Family Collection

This class is inspired by the Basic Course of the historical Bauhaus School in Germany, first developed by the artist Johannes Itten. Itten forged a series of student exercises based on what he believed was the formal basis of all of the visual arts. He proposed a series of 14 oppositions like “point/line,” “plane/volume,” “large/small,” “high/low,” and “thick/thin,” that he felt encompassed the essence of visual culture.

Invited by Walter Gropius to develop the Bauhaus basic course for the first Bauhaus school in Weimar during the late teens and early 1920s, Itten and his

students initiated, in a series of student projects, what became the canonical style of the Bauhaus. In 1964, Itten published *Design and Form*, images of his students' work along with short essays describing underlying concepts. This class, *Intro to Experimental 3D*, emerges from their work, and translates Itten's initial vision of the opposing structural forces that are the basis of visual form into a series of learning exercises designed for the Maya software environment.

The initial purpose of the Bauhaus was educational reform. The Bauhaus program was to merge the fine arts with crafts. Weaving and pottery were taught along with drawing, furniture design, painting, architecture, theater and metal works. Such a mix had never occurred in an art school before, where student's typical course of study was the copying of plaster casts of Classical sculptures and old masterpiece paintings. Itten's program utilized primary colors and forms to teach basic principals of contrast, form and rhythm, radical in their minimalism and also radically new.

Other early Bauhaus pedagogic innovations included a program taught by two professors: a Master of Form, who taught theory and esthetics, and a Master of Craft who was a technician with a high degree of skill. In Gropius and Itten's plan, the Bauhaus would ultimately educate a new breed of artist/artisans who could master both and would ultimately replace the dual system. In their first year, students took Itten's Basic Course intended to cultivate a mastery of theory and esthetics. Only if students successfully passed that class, were they permitted to take the workshops in which the education was skill based and technological.

Itten influenced the development of a Bauhaus visual style that was based on balanced asymmetrical compositions of primary forms. Although the school was initiated in 1919, this style didn't fully crystallize until Theo van Doesberg, who with Piet Mondrian was one the founders of the De Stijl movement in Holland, brought the influence of non-objective art to the Bauhaus during his tenure there between 1921-22. Like Itten, van Doesberg and the De Stijl artists felt that the function of art was to unify opposing forces of life: nature and intellect; female and male; negative and positive; static and dynamic; horizontal and vertical. This was also expressed in terms of a formal abstract language inspired by fundamental, geometric forms.

The program of the Bauhaus gradually evolved beyond a symbolic and conceptual idea of radical renewal and regeneration through the use of essentialist, abstract forms, to one that also embraced the language of technology and industrialization. In 1919, Gropius's motto for the Bauhaus was "Art and Craft: A New Unity." But economic necessity changed that.

Gropius needed to make the Bauhaus independent of state support, minimal due to the radical, utopian direction of the school. In response, he reoriented the school's direction. The program of the Bauhaus, beginning in 1921, was also to

develop contemporary design for industrial production. Gropius's new 1921 school motto was: "Art and Technology: A New Unity." His plan was for Bauhaus workshop students and teachers to develop prototypes for manufacture. The Bauhaus would hold the copyrights of the designs developed in their workshops. The goal was to create new contemporary objects of "design," a term first brought into use during this époque, that were esthetic yet practically oriented towards mass production and newly available technologies. The Bauhaus would supposedly be sustained by their sale.

In 1923, Itten broke with Gropius and left the Bauhaus. A member of a metaphysical, spiritualist group, Itten was vegetarian, meditated, and wore a specially designed costume hybridizing the look of a priest with one that was streamlined and futuristic. His embrace of essential geometric form was similarly inspired by the tradition of sacred geometry and related to his spiritual practices. When Itten left the Bauhaus, the painters Lazlo Maholy-Nagy and Wassily Kandinsky, who assumed the Basic Course in 1923, replaced him.

While embracing the basic formalism and geometric essentialism of Itten, Maholy-Nagy supported both Gropius's industrial direction and the influence of the DeStijl esthetic that Itten had refused. Maholy-Nagy thought of a machine esthetic as being geometric, so he could fluently build on Itten's esthetic program. He required that the Masters of Craft teach available new technologies and utilize the potential of machines for production. Maholy-Nagy continued Itten's formal strategy of an asymmetrical balance of abstract forms and extended this to include unusual combinations of materials such as Plexiglas, metal and paper and glass. The Modernist motto, "form follows function" evolved at the Bauhaus during this time.

In addition to Maholy-Nagy's ideas about rationalized industrial production, Kandinsky introduced another concept that became a signature of the Bauhaus and was also in keeping with the school's intention of merging art, craft and industrial production. This was Kandinsky's idea of the "Gesamtkunstwerk," a "total work of art," in which all of the arts were combined and synthesized. The Bauhaus concept of many artists working in a unified school style - one single industrial and geometric esthetic - also crystallized when Kandinsky and Maholy-Nagy taught the Bauhaus Basic Course.

In 1925, the city of Weimar, withdrew its economic support of the Bauhaus, which was considered to be far too progressive, both esthetically and politically, despite Gropius's attempt to sever the school from overt political activity - specifically the socialism and left wing activism that was brewing at that time. The city of Dessau offered to support the school.

Gropius moved the Bauhaus to Dessau in 1925. At that time, he pushed for the technicalization and the rationalization of modern architecture. For the first time, he was able to develop a full architectural program at the Bauhaus. In Dessau,

Gropius built and designed teachers' housing that was ultimately destroyed in World War II. Before then, Gropius's buildings became known as the pinnacle of modern architecture in Germany, a demonstration of industrialized building technique and the "functionalist" architectural esthetic. Gropius remained the director of the Bauhaus in Dessau until 1928, when the success of his own flourishing architectural practice forced his resignation.

After Gropius, Hans Meyer, a Swiss architect, became the director of the Bauhaus. Meyer was a socialist and under him, the Bauhaus program was reoriented towards cooperative ideals. Meyer was anti-art and anti esthetic. He believed that design should express the harmonious balance of the individual and society, and also be easily manufactured, rational and inexpensive to produce and to buy. Meyer was the most successful of all of the Bauhaus directors at selling Bauhaus designs to industry, and under him, Bauhaus lighting fixtures and wallpaper were mass-produced and became standard consumer items. His tenure lasted 3 years. In the early 30s, National Socialism was on the rise, and Meyer ultimately was pushed out. He left Germany and moved to Russia to participate in what he believed was the construction of a utopian socialist state.

Mies van der Rohe replaced Meyer, striking any social intentions from the teaching of design at the Bauhaus. Under Mies, architecture was made into the centerpiece of study, with only a small number of artisan workshops remaining. The Basic Course was no longer the required center of the school's pedagogical program. Previously, the Bauhaus program had been based on the idea of the integration of theory and practice. Mies dropped the practical workshops as a significant element, focusing on the theoretical and esthetic only.

Under Mies, Bauhaus design expressed not social ideals but the estheticized sculpting of materials and space. Despite Mies' apolitical stance, the National Socialists closed the Bauhaus. To the Nazis, avant-garde art expressing the shifting values of its own time - whether overtly political or not - was a threat to be eliminated. The Bauhaus was closed in Germany in 1933. Mies and Maholy-Nagy fled Germany shortly after for Chicago where Mies became the director of the IIT to which he applied many of his Bauhaus principals.

WEDNESDAY

1. POLYGONS

1. The Polygon Menu.
2. Turning the cube composition into a polymesh.
3. Object Level Vrs Component Level: Vertices and faces (fn/F8).
4. Poly tools: Polygons>Edit Mesh>Extrude/Cut Faces Tool/Insert Edge

Loop/Poke Face/wedge Face/Merge Vertices/Merge Edges. Tool/
5. Polygons>Mesh>Sculpt Polygon tool.
6. Using History: Adding a smooth node: What is History?
7. When to use History and when to delete it. Edit>Delete by
Type>History.

2. BASIC LIGHTING

1. Environment colors. View>camera attribute editor> environment>color swatch.
2. Software Lighting
- 3 Point Lighting: Key, Fills and Back light. White light with grey elements: the default Lambert. (Black and White Photo look)
4. Lighting Variation: White objects with colored lights.
5. Window>Rendering Editor> Hypershader. Use the Hypershader to make a white Lambert material and apply to your objects.
6. How to use the Hypershader. Materials: lamberts, blinns and phonges.
7. Mental Ray: Default Final Gather: adding ambient light. The basis of photo-realistic light. Add ambient Final Gathering first, then add Key light. Add fills only if necessary.

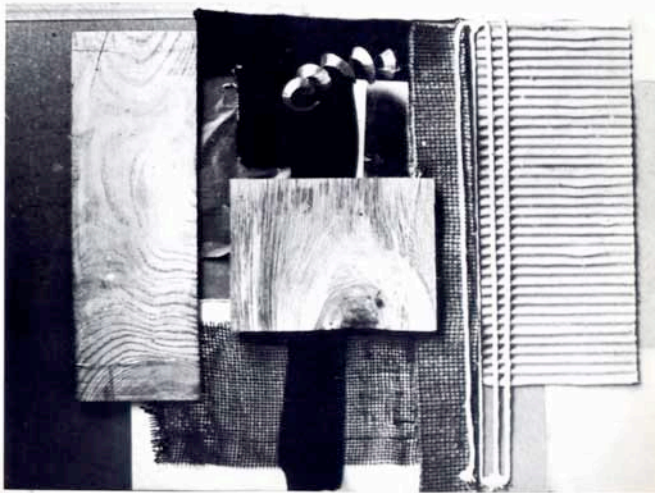
HW: Revised Point, Line, Plane and Volume compositions lit in 2 variations: with white light and grey objects and black background, and with colored light and white objects on white background.

HW: Turn your own last 4 compositions into a polygon mesh.
Save files for 2 variations: Unsmoothed and a tweaked smoothed.

Class 3.

1. Adding a texture to a polygon: UVs. Polygons>Create UVs>Automatic mapping.
2. The Rendering Menu
3. Texturing: Reviewing the Hypershader. Maya materials.
4. Using photos as textures: File Texture. Projecting a File Texture around a geometric form. Hypershade>2D Textures>As Projection is checked>File Texture. Insert texture.
5. 3D Procedural Textures. Hypershade>3D Textures. Wood, Marble, Granite, Leather, Rock, Brownian, Cloud, Stucco, Solid Fractals
6. Using a Ramp Shader to create a 2D or “toon shader” effect. Hypershade>Ramp Shader
7. How to Paint on Geometry. Rendering>Texturing>3D Paint Tool.

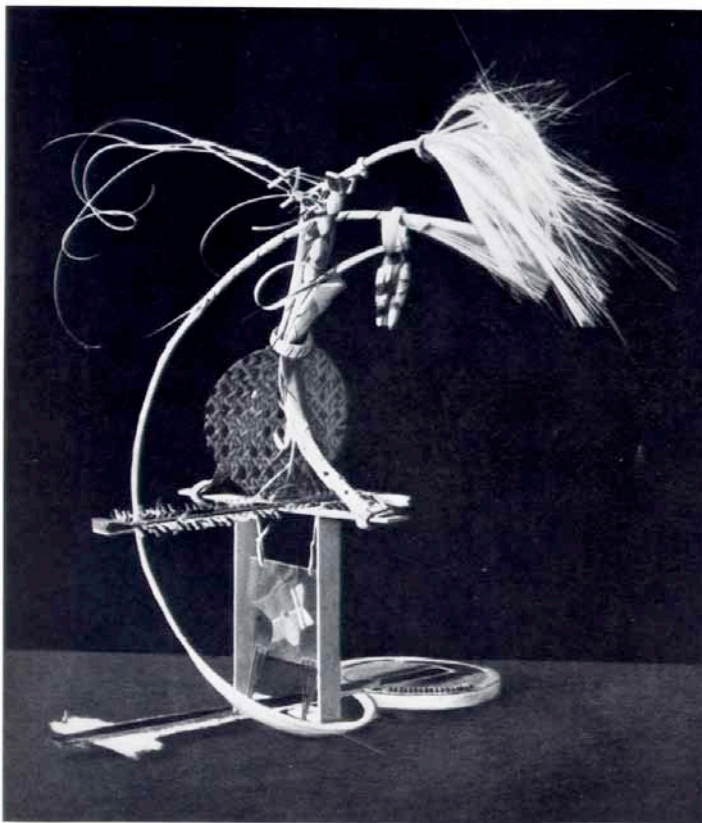
In Class: Textural Compositions on manipulated polygon primitives.



Montage of various materials. E. Bäumer, Berlin, 1927.

35

from *Design and Form* by Johannes Itten



from *Design and Form* by Johannes Itten

HW: 4 new compositions, this time : "Large-Small", "Thick-Thin", "High-Low" and "Broad-Narrow." Texture them and light them with software lighting. Make 4 JPEGs and bring to class.

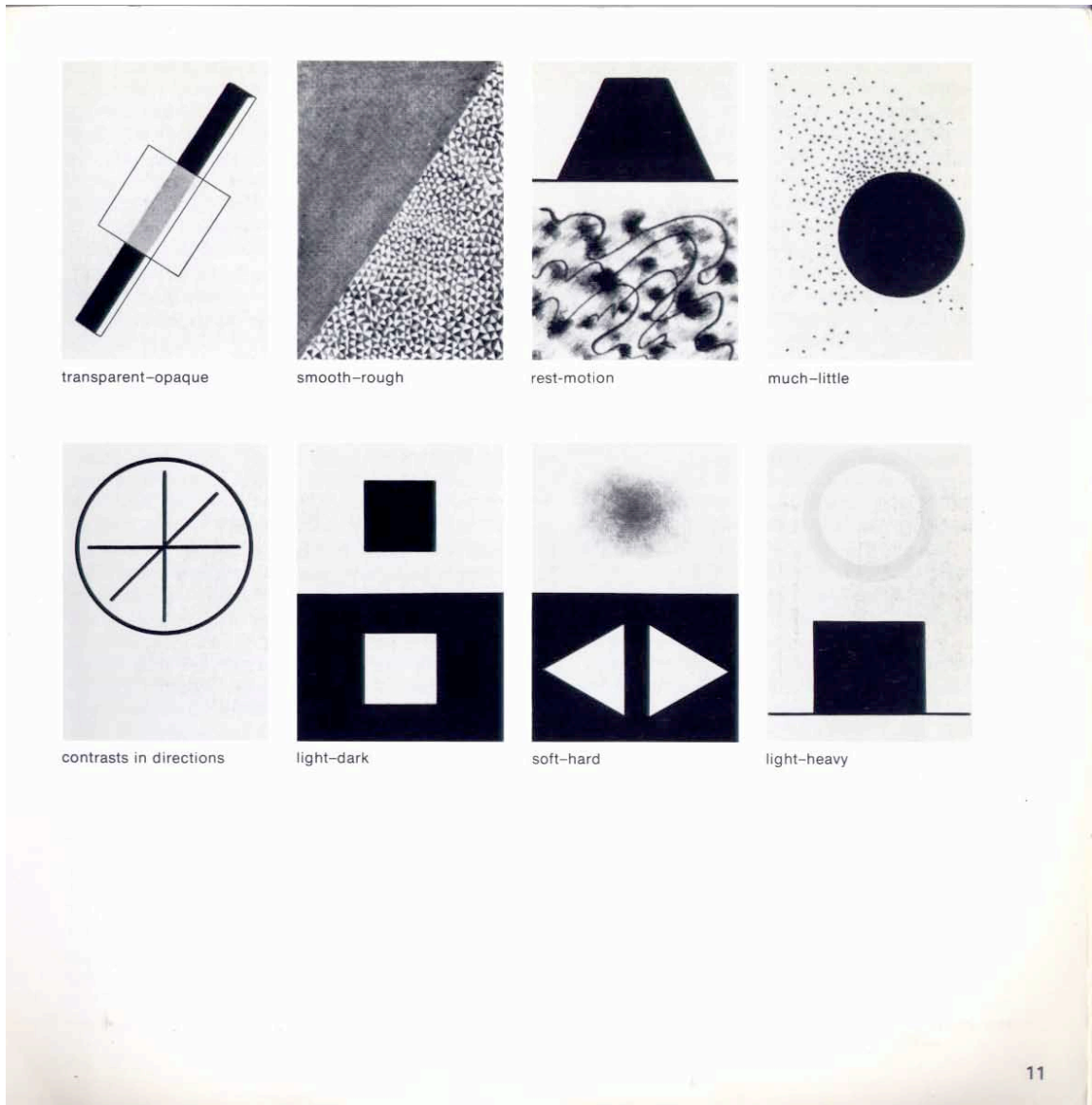
Class 4.

1. More on Lighting: Raytracing, Specularity and Reflections.
2. How to make glass. How to make a mirror.
3. The Ambient lighting affect: Final Gathering in Mental Ray and making and Occlusion pass using render Layers.
4. Rendering: Single Frame Rendering. DPI. Extensions.
5. How to Composite in Photoshop

HW: Redo your four “opposition” compositions but now light using Raytracing and and Occlusion Pass. Composite together in Photoshop. Make your image 8” x 10”, 300 dpi.

Class 5.

1. Paint Effects
2. Nurbs Surfaces: organic deformations vrs polygon crystalline surfaces.
3. Surfaces>surfaces>extrude/revolve/loft/birail/bevel.
4. Deformers as modeling tools: non-linear deformers
5. Animation>Create Deformer>Non-linear
6. Deformers>Bend/Flare/Sine/Squash/Twist/Wave
7. In class, create 4 more oppositional compositions, generally inspired by the terms below.



from *Design and Form* by Johannes Itten

HW: Create 6 Rendered, lit oppositional compositions, as begun in class, using paint effects and all surfaces.

Class 6.

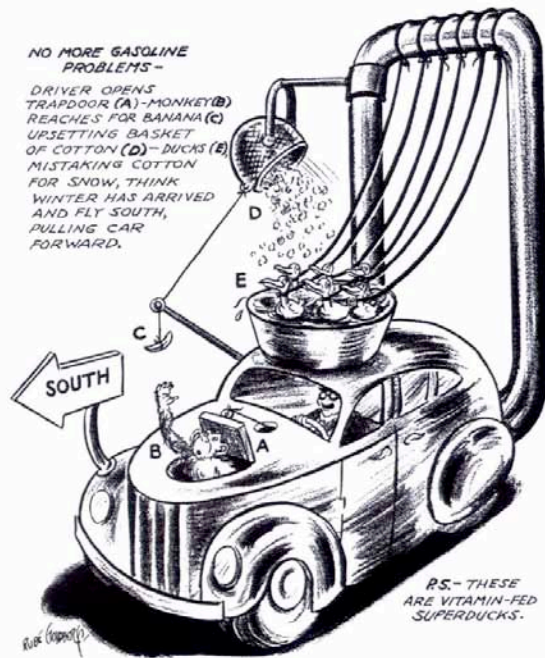
Rube Goldberg: "The Legendary works (A) of America's (B) most honored (C) cartoonist," by Maynard Frank Wolf."

Fischli Weiss: "The Way Things Go," 1987, 30 minutes

Here's a link which makes a relationship between Rube Goldberg, Fischli/Weiss and some familiar mass culture media:

<http://redyak.com/rants/Rube/rubeandthings.htm>

No More Gasoline Problems



Rube Goldberg Cartoon

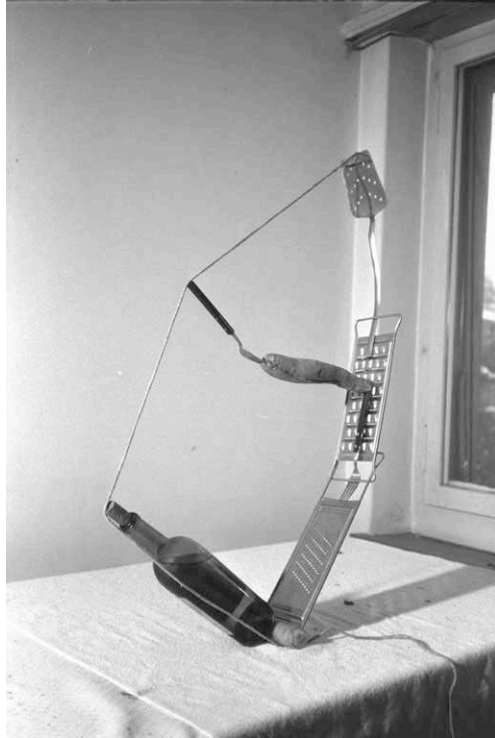
Our final project is to create an animation inspired in whatever way by:

The Bauhaus (a cross over between art and design inspired by the the latter days of the Industrial Revolution) + Rube Goldberg (a parody of industrial design) + the Fischli Weiss film, “The Way Things Go.” (these artists parody technological rationality in their ironic approach to the banal and everyday assumptions about “the way things work”).

Fischli Weiss just had a retrospective at the Tate Modern in London.

Here's a link:

<http://www.tate.org.uk/modern/exhibitions/fischliandweiss/rooms/room5.shtml>



Fischli Weiss, A Quiet Afternoon: Roped Mountaineers, 1984-85

The next classes will teach techniques of animation that lend themselves to such a project.

1. The Timeline. Animation rates: setting and saving.
2. The Animation Menu: Setting Keys.
3. Using the Deformers for animation: non linears
4. More Deformers: Lattices and Blendshapes.
5. Setting Keys with a Blendshape Editor.
6. Paths: Animating along a path on a live surface. Making a surface live (magnet icon). Duplicating Surface Curves (Surfaces>Edit Curves>Duplicated Surface Curves. More on Curves.
7. Flow animation. Using a Lattice deformer to make an animation Flow along a path. Animation>Animate>Motion Paths>Set Motion Path Key/Attach to Motion Path/Flow Path Object.

In Class Demo: An abstract Rube Goldberg machine: deformation roller coaster: animation along a path.

8. How to make a Play Blast (Window>Play Blast>Option Box
9. How to make a Batch Render.

Learning Maya on-line tutorials: Animation>Path Animation.

To download a pdf of all of the Learning Maya tutorials:

Help>Learning Path>Learning Maya Basics>Tutorials>Maya Tutorials>Maya 2011>Getting Started With Maya 2011.pdf

Learning Maya on-line Tutorials:Animation>Blendshapes

HW: Make a 100 frame animation, deforming along a path using blendshapes.

Class 7.

1. The Dynamics Menu.
2. Dynamics> Active and Passive Rigid Bodies.
3. Setting a Passive Key. Setting an Active Key.
4. Breaking Rigid Body Connections.
5. Fields: Gravity, Drag, Newton, Uniform.

Demo: In class: Dominos: a Rube Goldberg machine.

Learning Maya: Dynamics>Rigid Bodies

Learning Maya: Dynamics>Fields

Rube Goldberg inspired 100 frame animation using active and passive rigid bodies exposed to forces. Bring a playblast to class.

Class 8.

1. Constraints. Dynamics>Soft Rigid Bodies> Create Nail Constraint/Pin Constraint/Hinge Constraint/Spring Constraint/Barrier Constraint.
2. Springs. Dynamics>Soft Rigid Bodies>Create Springs

Learning Maya: Dynamics>Constraints

Learning Maya: Dynamics>Springs

In class demo: another Rube Goldberg Machine.

HW: 100 frame animation using Constraints and Active and Passive Rigid Bodies. Bring a Playblast to class.

Create Presentation of your concept of final project

Class 9.

IN CLASS PRESENTATION OF CONCEPTS FOR FINAL PROJECTS.

These presentations must include visual documentation and be substantial enough to provoke class critique and discussion of projects.

From this point on classes will consist of workshops, applying the techniques of the previous classes to your final project animations

A Rube Goldberg In-Class Demo: This is actually for 3D studio Max, another 3D software made by Autodesk who also produces maya. The pictures in the tutorial will show you the way, as complimented by my in-class demo:

http://www.3dsmaxresources.com/tutorial_display.php?id_tut=6

Class 10.

WORKSHOP

Class 11.

WORKSHOP

Class 12.

1. Render Wrangling: the trouble with rendering (let me count the ways).
WORKSHOP

Class 13.

Final Animation rough-cut due.

Each student must present:

- a. Three Rendered Frames from your animation: First, Mid and Last Frames at high-definition resolution (1080 x 1920)
- b. one Playblast of the entire 1-minute or 1800 frame animation, in low resolution, as a Quicktime movie using H264 compression.

Class 14.

Crit Week

You have presented your project last week. Over crit week, you should be rendering it

Class 15.

Rendered Animation of your Final Projects.

Student Guidelines

1. Every student is responsible for backing up and storing their material onto their own storage medium. Students **MUST** make two back ups of their work. Students files may **NOT** be stored on the local hard drives of lab workstations. These drives are cleaned every week, and any data left there will be lost. Loss of data through corruption of storage media is **NOT** an acceptable excuse for handing in work late or receiving an incomplete. Storage medium often become corrupt - this is why students are required to have a second back up.

2. SAIC Attendance Policy which **WILL** be enforced:

No more than three absences are allowed in order to receive credit, and excessive tardiness is not tolerated. **ATTENDANCE POLICY** from SAIC Bulletin: Students are expected to attend all classes regularly and on time. Any necessary absences should be explained to the instructor.

Students who are ill should contact me or leave a message for me in the department office the day they are absent. For an extended absence due to illness, contact Health Services. For other extenuating circumstances students must contact the Academic Advising office.

Please note that the written notification does not excuse a student from classes. Students officially enrolled in a course credit only if they have responded adequately to the standards and requirements set.

Also note that if a student registers late for a class (during add/drop), I will count the missed classes as absences and the student is responsible for assignments given during those missed days. -From Page 123-4 of SAIC Bulletin:
<http://www.saic.edu/life/policies/index.html#bulletin>

3. Accommodations for Students with Disabilities:

If you have a disability and may need an accommodation, please contact SAIC's Disability and Learning Resource Center (DLRC) by calling 312-499-4278, or by e-mailing dlrc@saic.edu. You should contact DLRC as early in the semester as possible. Staff at the DLRC will review your disability documentation and work with you to determine appropriate accommodations. They will then provide you with a letter outlining approved accommodations, which must be presented to me before any accommodations will be implemented.