

Materials and Building Strategies H79.2025

Fall 2011

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Class 1 – Sept 8:

- **Introduction**
- Class structure and overview
- Woodshop orientation & safety
- Intro to prototyping tools and materials
- Drawing basics
- Clay, foam, and foam core basics
- Assignment: Bring prototyping tools and materials to next class.

Class 2 – Sept 15:

- **Prototyping**
- Demo with cardboard, foam core, blue/pink foam.
- Scale
- Layout techniques – tracing paper
- Context models for previewing prototypes
- Hand tools: xacto knife, mat knife, straightedge, cutting mat, sanding boards
- Adhesives: white glue, yellow glue (aliphatic resin), adhesive transfer tape
- Assignment – Construct a foamcore object and make an object out of solid blue/pink foam

Class 3 – Sept 22:

- **Wood**
- About wood – what to look for, what to avoid
- Keeping it straight & square
- Woodworking bench, vises and clamps
- Hand tools: square, hammer, dozuki saw, drill, screw gun, large sanding board
- Power tool demo
- Assignment: Build a frame, keeping corners square.

Class 4 – Sept 29:

- **Plastics**
- Characteristics of plastics - acrylic, polycarbonate, ABS, styrene, polyethylene, PETG
- Cutting, drilling, bonding, laminating, and fastening
- Fabricating and finishing demo
- Hand tools: plastic scoring tool, razor blades, sandpaper, polishing wheel, small paint brush
- Adhesives: plexiglas glue (methylene chloride)
- Assignment: Construct an acrylic plastic object.

Class 5 – Oct 6:

- **Casting and Mold Making I**
- Types of molds and mold making materials
- Clays
- Alginate box mold
- Two-part blanket mold
- Casting plaster
- About rubber
- Hand tools: wire cutters, mixing bowls, scraper, rasp
- Assignment: Make a box mold and cast with plaster.

Class 6 – Oct 13:

- **Discuss Midterm**
- **Casting and Mold Making II**
- Polyurethane resin
- About silicone rubber
- Techniques for large molds
- Wet-forming plaster using a screed
- Hand tools: wire cutters, mixing bowls, scraper, rasp
- Assignment: Make a silicone rubber mold and cast with polyurethane.

Class 7 – Oct. 20:

- **Metals**
- Working with sheet metals, cast iron, steel, aluminum, brass, copper
- Cutting, drilling, tapping, threading, fastening
- Hand tools: tap and die, metal punch, tin snips, shear, brake, and roll
- Power tools: Saber saw, drill press
- Adhesives: epoxy
- Assignment: Make a sheet metal object fastened with rivets.

Class 8 – Oct. 27:

- **Lecture - Kiosk Basics**
- Plywood, MDF, and laminates
- Bending wood and laminates
- Vandal-proofing
- Power tools: router
- Adhesives: contact cement
- Assignment – Complete midterm project

Class 9 – Nov. 3:

- **Present Midterm Projects**
- Assignment: Make sketch/prototype for final project.

Class 10 – Nov 10:

- **Sewing Machine Basics**
- Advanced fabrics

- Building with glass, carbon, and aramid fiber composites
- Screens and curtains for installations
- Lathe basics
- Assignment: Develop final project.

Class 11 – Nov 17:

- **Structures for Installations**
- Torsion-box construction for portable walls
- Gypsum board, metal studs, joint compound
- Bracing, wire rope, and fasteners
- Final project Q & A
- Assignment: Develop final project.

THANKSGIVING BREAK

Class 12 – Dec 1:

- **Lecture - Rapid prototyping technology**
- Exotic materials and methods
- Syntactic metal and ceramic foams
- Reshape prototyping foam
- Final project Q & A
- Assignment: Develop final project

Class 13 – Dec 8:

- **Paints and Finishes**
- Appropriate level of finish
- Final Project more than half complete - critique and work session

Class 14 – Dec 15:

- Final Project Presentations

Note: because of the nature of this class, content may be changed or rescheduled

Assignments:

Each week for the first half of the semester a required assignment will be given for all students to complete. Unlike many assignments at ITP these are **not** to be collaborations with other students. The assignments are basic applications of principles discussed and demonstrated during that class. Assignments are beginner level for each material covered. If a student has experience with any of the materials or techniques covered in a class they are encouraged to go beyond the minimum assignment to make something that can serve as an example to the rest of the class. During each class, the assignment from the previous week will be discussed and handed in. We will not look at all work every week, but everyone will show his or her work at least a few times during the semester.

Midterm and Final:

Every student will complete a midterm project on their own and also a final project, something

original demonstrating principles covered in class. Both midterm and final require the building of a three-dimensional object. Sketches or other media may not be substituted and will only be accepted in support of the presentation of the object. Students may work alone or in groups on the final. For those that work on the final in groups: due at the time of presentations will be a written log which will explain each persons role and the work that each person did on the project.

For those who are working on a project as part of a group project in another class: please give me the parameters of the assignment for the other class in advance to make sure the overlap between classes is appropriate.

Grading:

- Participation & Attendance: 20%
- Weekly Assignments 40%
- Midterm: 20%
- Final: 20%

Tools and Materials

A list of tools and materials needed for the first few weeks will follow. You will end up spending money on materials in this class. It can be done reasonably inexpensively, by sharing the cost of tools and materials, scavenging, reusing, and so forth, but more ambitious projects inevitably make demands on your budget.

Books

Suggested reading:

The Art of Innovation – Tom Kelley, 2002

Extreme Textiles: Designing for High Performance – Matilda McQuaid, 2005