OVERVIEW

Learn to design, build & animate an animatronic character head in this 4-week Live Webcourse with master creature effects mechanic Craig Caton-Largent (Jurassic Park, Terminator 2: Judgment Day, Predator 2). Using budget-friendly, readily accessible tools and materials, Caton-Largent will take you step-by-step through his entire animatronics process, from creating a fiberglass under skull to mechanizing the face, including servo-driven eye and brow mechanisms, jaw and lip articulation, and finally, how to puppeteer your mechanical character.

LIVE WEBCOURSE HIGHLIGHTS

Designing a Mechanical Puppet Head
Creating and Segmenting a Fiberglass Under Skull
Controlling Skin Thickness
Assembling and Mounting an Eye Mechanism
Building Eyebrow Mechanisms
Jaw Mechanisms & Lip Articulation
Installing Servos & Servo Trays
Puppeteering Animatronic Characters

COURSE CURRICULUM

DAY 1 - Tuesday, October 25th, 2016 - 12pm - 4pm PST

- Create fiberglass under skull.
- Importance of controlling skin thickness in the various areas of the head
- Using clay cutters and other sculpting tools for laying-up clay
- Laying-up clay for under skull
- Prep existing core for plaster bandage application
- Use plaster bandage to create “throw-away mold” for under skull on core
- Prep throw away mold for epoxy/fiberglass lay-up
- Lay-up epoxy/fiberglass
- Join fiberglass skull halves together

Homework Week 1

Finish making epoxy/fiberglass under skull. Make sure you let the epoxy cure for 24 hours before attempting to remove it from mold. If you find any thin spots, you can add more epoxy/fiberglass to those areas. Trim and sand the seams where the mold halves meet. This can be done using sand paper, Dremal Tool (or other moto-tool) Xacto Blades or whatever you might think will work. Make sure to wear a respirator and safety glasses. Remember, moto-tools and tools with sharp blades need extreme care and caution when using to avoid injuring yourself.

Calculate what the distance is between the pupils of the eyes and also the diameter of the eyes. These measurements will be helpful for creating the eye mechanism for the next class.

DAY 2 - Tuesday, November 1st, 2016 - 12pm - 4pm PST

- Trimming and cutting under skull
- Designing eye mechanisms
- Building and assembling eye mechanisms
- Mounting the eyes into the under skull
- Calculating eyebrow circumference

Homework Week 2

Finish designing/building the eye and eyelid mechanism. Mount it to the under skull. Make sure the eye/lid mechanism can be removed for working on the rest of the head, do not make it permanent.

DAY 3 - Tuesday, November 8th, 2016 - 12pm - 4pm PST

- Creating the eyebrows
- Creating and installing servos and servo trays
- Start jaw mechanism

Homework Week 3

- Decide which method you want to use to create the eyebrows and complete them.
- Create the servo tray and mount it to the under skull. Make sure it can be removed, do not make it permanent.
- Determine where the jaw is going to be and carefully cut it out and add hinges to connect it to the under skull.

DAY 4 - Tuesday, November 15th, 2016 - 12pm - 4pm PST

- Finish Jaw mechanism; mount inner mouth and teeth
- Install the lip controls and finishing touches

Homework Week 4

Finish jaw mechanism and lip mechanisms. Add teeth and do final assembly. Place skin on head and determine where you need to glue it to get best results. Determine what method you want to use to animate the servos and proceed.

Materials

CLICK on the links below to find the materials you need for this lesson. Some items might be harder to find, but a little internet scouring usually finds you everything you'll need.

Burman Industries McMaster Carr Smith Brother's Hobby Center

FOR YOUR WORKSTATION
Headform - if you do not have a headform of your character, you can buy a generic one to use for this lesson.

MATERIALS
Fiberglass cloth 6oz Heavy (2)
20min Epoxy
Plaster Bandage (for creating mold)4"x15" (3)
Mold Release

CHARACTER EYES
Eyes can be made from anything except glass - they need to be able to be drilled, cut and altered.

SERVO TRAYS
Birch Plywood 3/16 x 6 x 12
Birch Plywood ¼ x 12 x 24
#5 wood screws

MISCELLANEOUS
Eyebrow Wire 3/32" x 4:40 thread (Du-bro 6pack)
Eyebrow pushrod housing (Du-bro)
Ball Link Sockets 2/56 (Great Planes) (2)
Insta Cure cyanoacrylate 2oz
Insta Cure accelerator 2oz
Rod End (clevis) 2 pack
Dual Servo Horn #3342(Du-Bro) 2 pack
Goldenrod #507 .032" multi-strand cable

TEETH
Acrylic Resin Teeth: size 24
Jet liquid monomer to make gums (Davis Dental)
Jet powder
Key-To-Alginate fast set for molding (Davis Dental)

SERVOS
Jaw Servo (Hitec HS-645MG)
Eyes Horizontal Rotate (Hitec HS-53)
Eyes Vertical Rotate (Hitec HS-82MG)
Eyelids 2 needed (Hitec HS-82MG) (2)
Brows 2 needed (Hitec HS-82MG) (2)
Upper lips 2 needed (Hitec HS-82MG) (2)
Mouth corners 2 needed (Hitec HS-82MG) (2)
Lower Lips 2 needed (Hitec HS-82MG) (2)

MISCELLANEOUS
Goldenrod #508 .056" multi-strand cable (2)
E/Z Connectors 12 pack
Eye Lid Brass Strip .032" x ¼"
Eye Mech Brass Strip .469" x ¼" (2)
Brass Strip .064" x 1/4" x 12"
Sand Paper 120 grit and 400 grit
Threaded Rod 2/56" x 12"
Threaded Rod 4.40 x 12"
Brass Rod 1/8" x 12"

TOOLS

BITS & INDEXES
2/56 Tap and handle (8. in image)
Drill bits (you will only need some of the smaller ones) (9.)
CLAMPING, CRIMPING & GRIPPING TOOLS
Needle nose Vise Grips (11.)
Needle Nose Pliers (12.)
Pliers (13.)
Tweezers (19.)
Vise (6.)

ELECTRONIC TOOLS
Servo Tester with Battery pack (super useful) (5.)

POWER TOOLS
Dremel Tool with Sanding Drum, Circular Blade, and grinders (24.)
Drill Motor (25.)

WRENCHES
Allen Wrench Set (Inch and Metric) (4.)

CUTTING TOOLS
Automatic Center Punch (you can use a nail instead) (18.)
Coping Saw (10.)
Cable Cutter (14.)
Flat Cutters (optional) (23.)
Hack Saw (16.)
Side Cutters (alternate for Tin Snips) (22.)
Tin Snips (21.)
Wire Cutter (15.)
Xacto Knife (20.)

MEASURING TOOLS
Ruler (1.)
Digital Veneer Calipers (Your most used tool!) (2.)
Adjustable Protractor (3.)

SCREWDRIVERS
Screw Drivers Flat and Phillips (17.)

NOTE: Craig will also be using a Table Top Drill Press, a One Inch Belt Sander, and a Scroll Saw. However, these can be substituted with an electric hand drill(or Dremel Tool), sand paper, and a coping saw, respectively

HEALTH/SAFETY PRECAUTIONS

When working with toxic and/or dangerous materials or tools:
ALWAYS read labels for appropriate use guidelines
ALWAYS wear a high-grade respirator
ALWAYS work in a well-ventilated area
ALWAYS protect your skin
ALWAYS wear eye protection