

Burlington Technical Center
Design, Engineering, and Fabrication
Dan Treinis, Instructor

Program Advisory Board
11/28/23 - Meeting #3
3:30 - 4:30

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Attendees:

Agenda:

*Welcome and Introductions - please say hello to the group.

Please share a brief overview of what you do and where you do it.

In your free time, are you a maker? Designer? Manufacturer?

*Program Overview - what are we currently doing, what learning and activities have we done/accomplished. Updated cellphone policy (facility-wide)

Morning Class:

Measuring: Students are proficient measuring to a 1/16". We have begun converting decimals to fractions and fractions to decimals (no calculators).

Adding, subtracting, multiplying, and dividing fractions is next, followed by learning how to read/use a vernier caliper (imperial).

Tools: Students have been trained to use the GlowForge lasers. All students have learned how to use the chop saw and are "approved" for solo use. Up next: table saw and surfacer. Students will also be instructed/trained to operate the CNC's - two have pendants and one is laptop controlled.

Software: Students began the school year being introduced to and using CADstd - a very inexpensive, basic, 2D CAD software. That was a good introduction to drafting/CAD and students are now learning how to use AutoCAD and following a training program through SolidProfessor to, ultimately, become Autodesk AutoCAD certified. Some students have completed 50% of the training already!

Projects/Activities: Using their 2D drafting/CAD skills, students first created a basic box that was constructed of laser cut 1/8" birch plywood. Next, students were challenged to design their own box within the limitations and constraints set forth in the design challenge. <<share engineering journals>>
Students are now learning to use Vectric V-Carve and the CNC routers. The introductory project is a "power word" sign that teaches students how to input their material, run toolpaths and previews, and, ultimately, to create a high-quality "power word" sign. Next, students will have the opportunity to design a

sign that is a size of their choosing that can have multiple words. One of the end goals of CNC routing is straight milling to create profile cuts. <<share pictures>>

Site Visits: VTANG's LO shop and fabrication shop, Fab-Tech, BETA, Champlain Cable, in-class speaker from Treeline Terrains. **Upcoming Site Visits:** Lane Press

Practiced precision measuring, primarily imperial, using rulers, vernier calipers, digital calipers

Applied math concepts: adding, subtracting, multiplying, dividing fractions. Worked with scale and ratios. Calculated unit costs.

Learned introductory CAD/CAM software: CADStd., SketchUp, V-Carve, LightBurn, MakerBot Print, Glowforge

Tools/Machines: Glowforge and Laguna laser, MakerBot Method X Carbon Fiber and Replicator, chop saw, table saw, drill press, soldering

Afternoon Class:

Measuring: Worked on decimals to fractions and fractions to decimals. Studied fasteners: notation, drive types, head styles, measuring diameter, thread count, and length, materials, and grade/class. We have also begun a SolidProfessor course in GD&T - we are approximately 50% done with the training.

Tools: Students helped assemble and learn how to use the Wazer water jet to cut metal parts from sheet material. Students completed an introductory sheet metal project and used aviation snips, blind rivets, stomp shear, and finger brake to fold the sheet into a finished product. This is in preparation for continuing/completing our reverse engineering spatula project (see below).

Software: Students continue to train on Fusion360 (sheet metal) and AutoCAD. In order to use the water jet, students have learned how to prepare cut files using Wazer's WAM software. Lightburn software is next as we prepare to cut 1/2" solid pine on the Laguna laser.

Projects/Activities: Our main activity for the first quarter was reverse engineering a spatula. <<share engineering journal>> This project draws on many different skills and tools. While we await the delivery of our stainless steel, we have begun learning about electric motors. We are just completing the construction of a model DC motor (from a kit) <<show model>>. We expect our Switch car to be delivered in mid-December and will begin assembly of it ASAP. <<Switch Labs website>>

Sarah said to make sure to have students go back to review skills learned in different process, reflect on all tools used and why, review technical drawing aspects- be able to articulate what they learned.

Reach out to Sarah when it comes time to work on cells/batteries.

Site Visits and WBL (work-based learning): VTANG's LO shop and fabrication shop, Blodgett. **Upcoming Site Visits:** Hallum-ICS, in-class speaker from Colchester's DPW. **Job Shadows:** Tri-Angle Metal Fab (2), Preci-Manufacturing, Husky, Twincraft.

***Looking for Support/Ideas:**

Sheet metal projects that are small. Sheet metal scrap and sheet metal tools like a stomp shear (the one we use is aviation's and it's cranky and in need of service). Other suggestions for sheet metal work? Additional project ideas and materials to process using the water jet. Metal cutting laser - I would love one of these! Does anyone have \$80,000 to donate to the program so I can buy a Trumpf fiber laser?

Follow up with **Elianne Wijler Klinefelt** to discuss having Brock come in to do a tutorial on students writing your own code for CNC.

*Items for spring meeting:

New employee skills - what is lacking, what is needed. Do you have a cellphone policy I can share with students?
Next year's plans, projects, and curricula. New facility update.

*Other: ?