

FRC 6328 CAD Training

Week 1: Introduction

Course Outline

Week 1: Introduction to CAD and the training format

Week 2: Introduction to sketching

Week 3: Introduction to part design

Week 4: Effectively using Part Studios

Week 5: Assemblies and mate connectors in Onshape

Weeks 6-10: Using CAD to design for FRC and beyond

***We'll try to give opportunities for those who are more familiar with CAD to get ahead/do more advanced things in the first half of the training*

Meet the Training Staff

Mentors:

- Dave, Jack, Max, Noah, Sam

Student TAs:

- Alisha, Maddie, Shirish

Office Hours:

TBD

Course Format

- Weekly meeting to go over homework and introduce next week's material
- New tasks to complete each week for homework
- Google Form to submit homework and show us your progress
- Ask questions!!
 - We'll have TA office hours for you to drop in ask questions on Zoom
 - Slack is always there with lots of us to ask questions
 - Either post publically or DM one of us

Resources

- Resources to help you will be posted on slack
- They will either be google documents or links to our CAD website



Blog Getting Started Calculators CAD Library External Resources About

Resources

Calculators

Useful mechanical calculators to help with design.

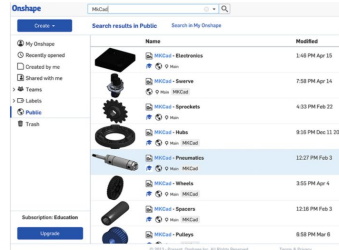
2 Speed Drivetrain			
Free Speed (RPM)	Stall Torque (N*m)	Stall Current (Amps)	Free Current (Amps)
5310	2.41	111	2.7
		81%	90%
# Gearboxes in Drivetrain	# Motors per Gearbox	Total Robot Weight (lbs)	Weight on Driven Wheels
2	2	154	100%
Driving Gear	Driven Gear	High Speed Driving Gear	High Speed Driven Gear
12	40	40	44
1	1	21.02 51%	20.28 51%
12	24	7.33 1 <- High Gear	7.33 1 <- High Gear
Low Speed Driving Gear	Low Speed Driven Gear	Drivetrain Free Speed	Drivetrain Low Gear "Real Life" Speed
24	60	5.18 51%	4.12 51%
16.67 1 <- Low Gear		38.66 Amps	

Blog

Check out these few featured blog posts, be sure to check out the full blog [here](#).

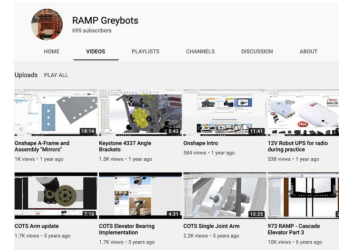
CAD Library

COTS components and custom scripts to use in Onshape.



External Resources

Content from other sources to help teach design.



Using the TubeConverter



Welcome to

Week 1 Objectives

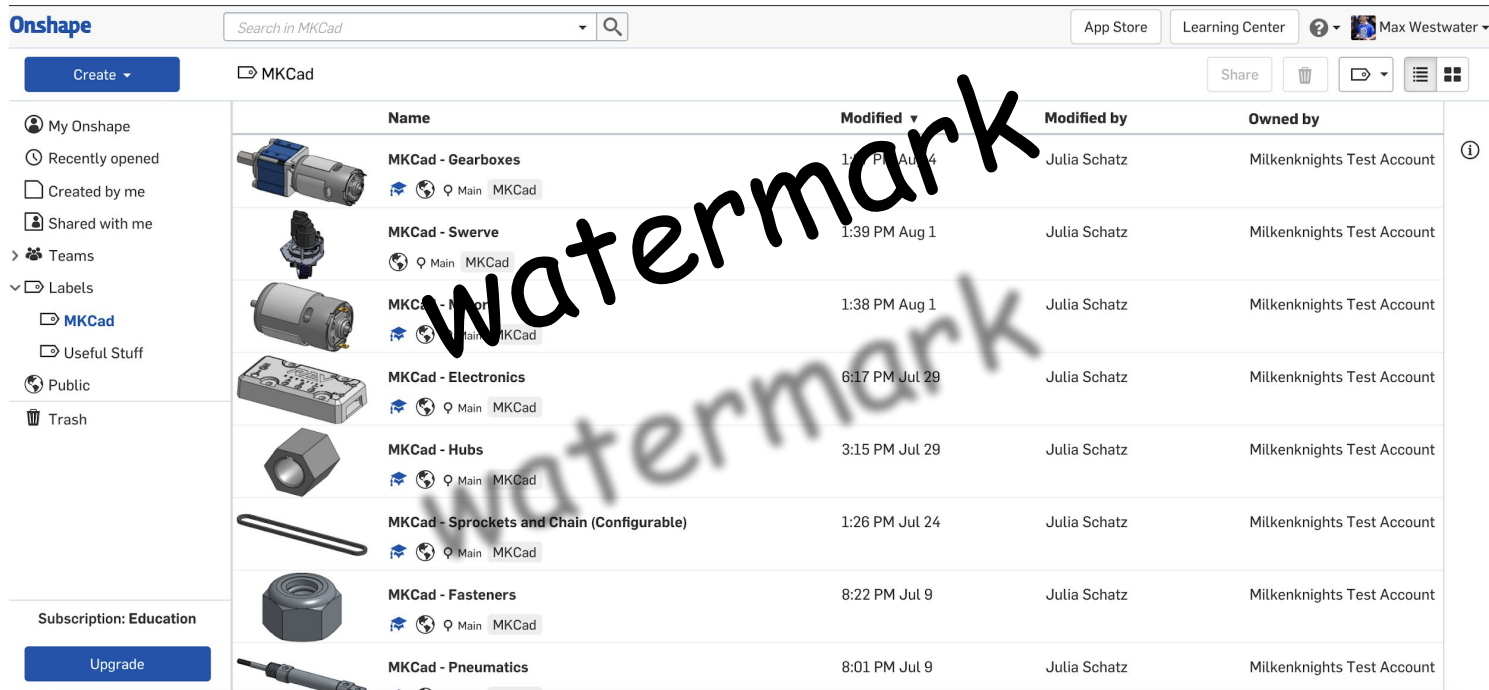
- Setup your Onshape account
- Link the CAD libraries and helpful scripts we'll be using
- Complete introduction training courses
 - Introduction to Parametric Feature-Based CAD
 - Navigating Onshape

What you need to do this week




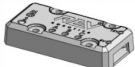




- Navigate to onshape4frc.com/getting-started and follow instructions under
 - Creating Your Account
 - If you already have an account that's great. Double check to see if your edu subscriptions needs to be renewed and do so if needed
 - Linking MKCad Parts Library
 - Adding Useful Featurescripts
 - Complete Onshape Learning Pathway Tutorials - **Numbers 1 & 2 only**
- Submit your results in the HW submission form
 - <https://forms.gle/Q4W2SmD8qkLD3xBe8>

Example Submission - MKCad

From the main page click on your MKCad label to show the documents in it

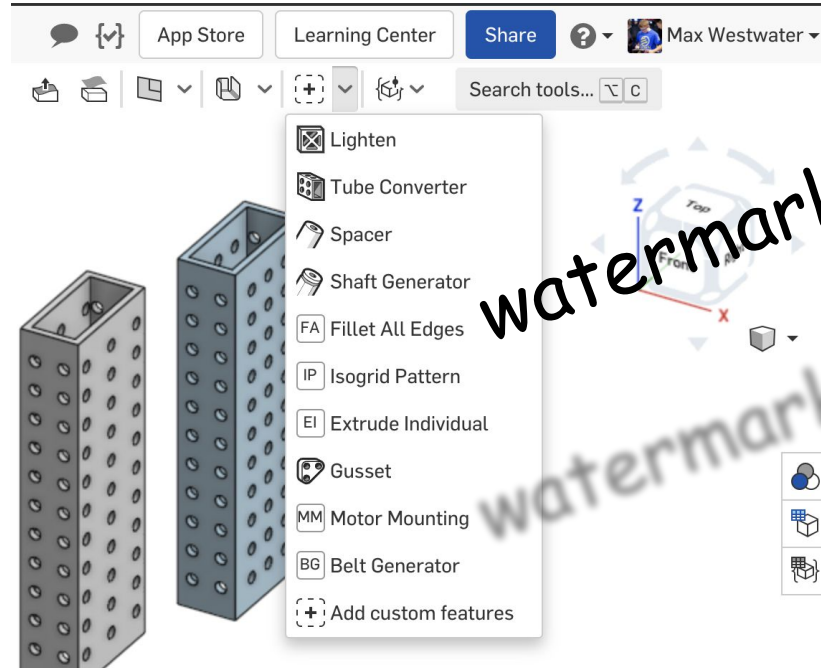


The screenshot shows the Onshape web interface. At the top, there is a search bar labeled "Search in MKCad" and a user profile for "Max Westwater". Below the search bar is a "Create" button and a "MKCad" label. The main content area displays a list of CAD models, each with a thumbnail image, a name, a modified date, a modified by user, and an owned by account. A large "watermark" is overlaid diagonally across the center of the image.

Name	Modified	Modified by	Owned by
 MKCad - Gearboxes Main MKCad	1:17 PM Aug 4	Julia Schatz	Milkenknights Test Account
 MKCad - Swerve Main MKCad	1:39 PM Aug 1	Julia Schatz	Milkenknights Test Account
 MKCad - Motor Main MKCad	1:38 PM Aug 1	Julia Schatz	Milkenknights Test Account
 MKCad - Electronics Main MKCad	6:17 PM Jul 29	Julia Schatz	Milkenknights Test Account
 MKCad - Hubs Main MKCad	3:15 PM Jul 29	Julia Schatz	Milkenknights Test Account
 MKCad - Sprockets and Chain (Configurable) Main MKCad	1:26 PM Jul 24	Julia Schatz	Milkenknights Test Account
 MKCad - Fasteners Main MKCad	8:22 PM Jul 9	Julia Schatz	Milkenknights Test Account
 MKCad - Pneumatics Main MKCad	8:01 PM Jul 9	Julia Schatz	Milkenknights Test Account

Example Submission - Featurescripts

Go to any document inside a part studio to show the drop down of your custom features



Example Submission - Course Completion

After completing a course you can go to [this link](#) to view your completion status



Activity

In Progress 3 Learning Paths 2 **Completed 2**

> Navigating Onshape Course | Self-Paced [View Course](#)

✓ Introduction to Parametric Feature-Based CAD Course | Self-Paced [View Course](#)

An introduction to the principles of modeling in a parametric feature-based CAD system.

TOTAL HOURS	CONTENT VIEWED	COMPLETE
0.0	100 %	100 %

watermark

Any Questions?