

# Modified Bicycle Motion Capstone

## Team 19

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Kathryn Zoe Lucke

Matthew Palmer

- Client Contact

- Web Developer

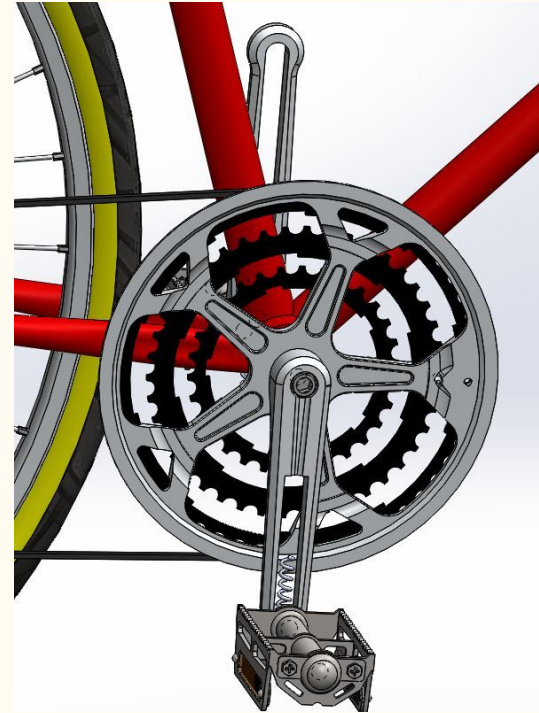
- Project Manager

- Secretary

- Budget Liaison

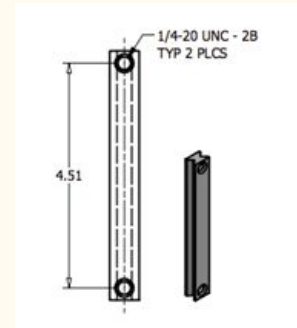
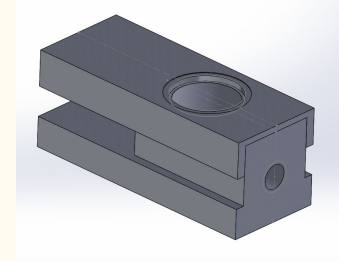
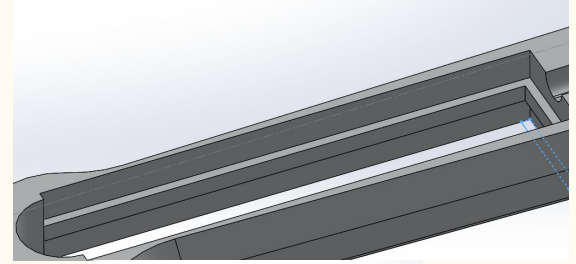
# Project Introduction

- Modified Bicycle Motion
  - Limit Range of Motion (ROM) experienced by the knee
  - Create maximum torque
  - Limit the modifications



# Updates

- Two Prototypes
  - Thomson Linear Rail and Compression Spring
  - Spring
  - 1 Compression Spring
- All Parts Purchased



# Manufacturing & Individual Responsibilities

- Matthew - Fasteners
- Fahad - Linear Rail
- Zoe - Springs
- Alex - Crankarm Design
- Basem - Rubber Stops

## Parts to be Manufactured

Crankarm

Pedal Assembly

Modified Washer

Linear Rail

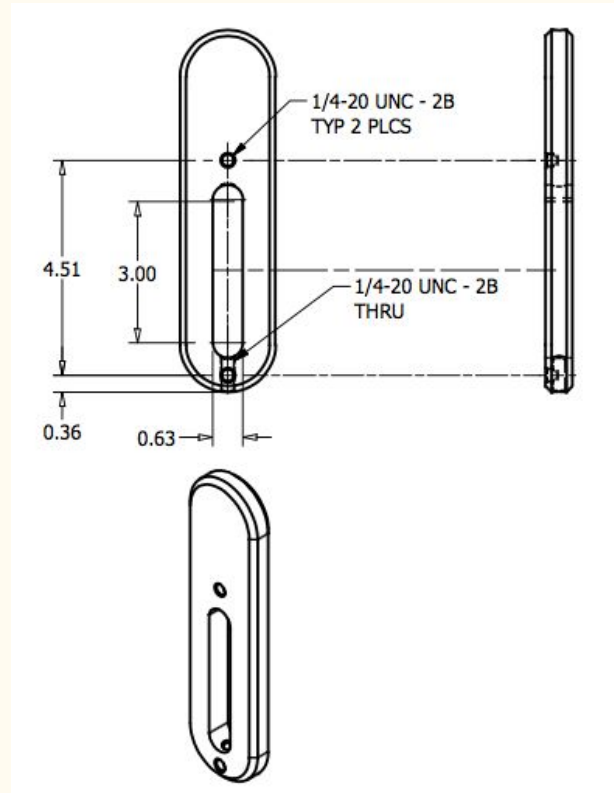
# Crankarm

Tooling Required:

$\frac{1}{4}$ "-20 tap

$\frac{5}{8}$ " Milling Cutter

Deburring Operation



# Pedal Assembly

## Tooling Required:

9/16"-20 tap (both RH and LH Thd)

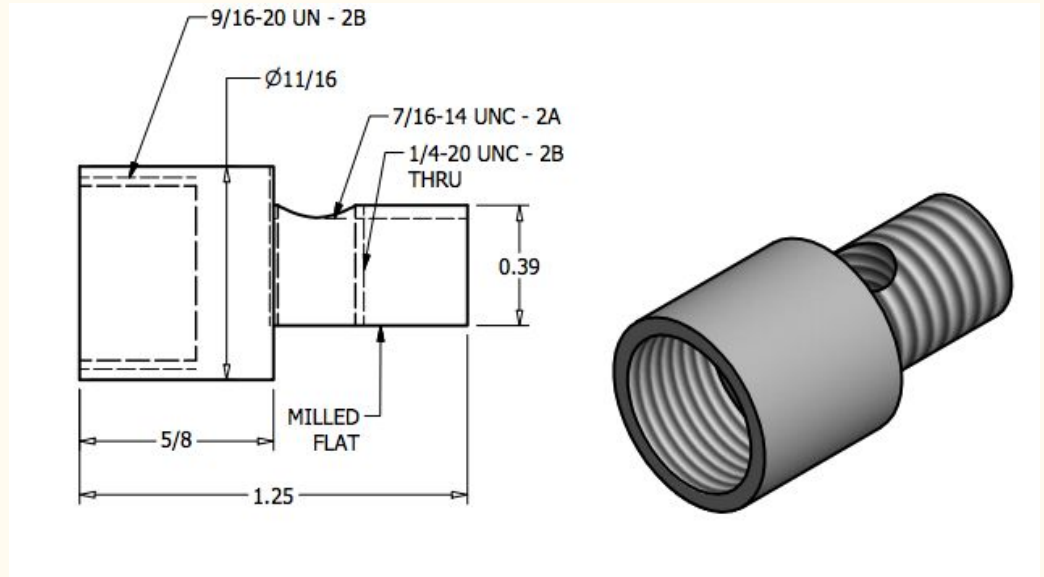
7/16"-14 die

1/4"-20 tap

Lathe Operation (CNC)

Milling Operation

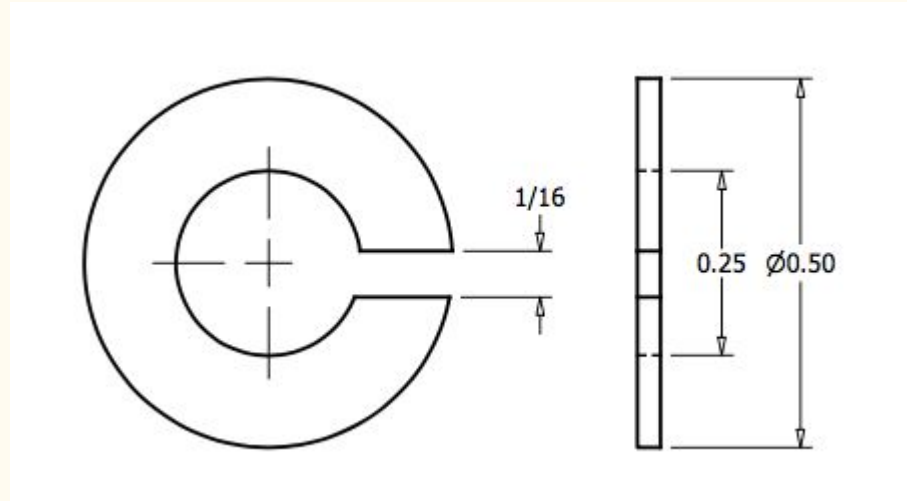
Deburring Operation



# Modified Washer

Tooling Required

Hand Dremel



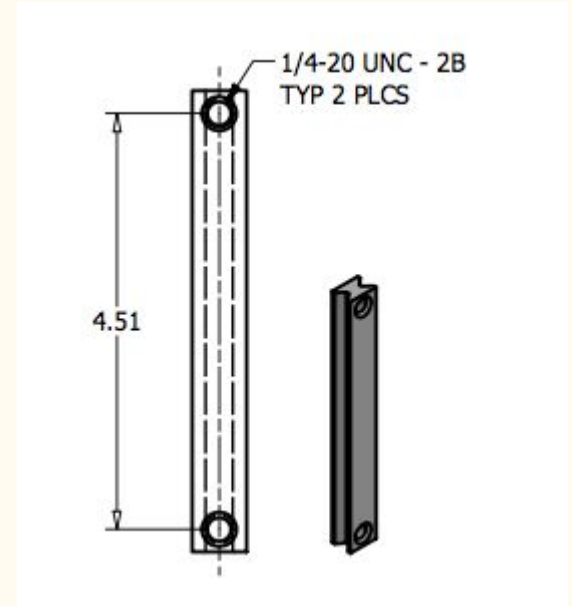
# Rail Assembly

Tooling Required:

Band Saw

1/4" - 20 Tap (with 80° Counterbore)

Deburring Operation





# Design of Experiments

- Test two spring stiffnesses
  - Test two spring lengths
- Tests to be done on a bicycle resistance trainer and are to be videotaped

# Schedule and Budget

## Schedule

Team Meetings	01/17/2017	01/17/2017
Staff Meetings	01/24/2017	01/24/2017
Presentations	01/31/2017	01/31/2017
Team Meetings	02/07/2017	02/07/2017
Hardware Review 1	02/14/2017	02/14/2017
Staff Meetings	02/21/2017	02/21/2017
Team Meetings	02/28/2017	02/28/2017
Midpoint Report	02/28/2017	02/28/2017
Midpoint Review Presentations	03/07/2017	03/07/2017
Hardware Review 2	03/21/2017	03/21/2017
Team Meetings	03/28/2017	03/28/2017
Staff Meetings	04/04/2017	04/04/2017
Presentation walk-throughs	04/11/2017	04/11/2017
Final Product Testing Proof	04/18/2017	04/18/2017
Team Meetings	05/02/2017	05/02/2017
Final	05/04/2017	05/05/2017

## Budget

- Total budget: \$1500

#	Part Name	Quantity	Cost (\$)
1	Cranksets	3	91.93
2	Fasteners (A set of fasteners is comprised of: 2 bolts, 4 washers, and 2 nuts.)	2 Sets	7.00
3	Springs (Spring 1: $k=10$ lb./in and Spring 2: $k=30$ lb./in)	4	3.84
4	Thomson Linear Rail	2	199.90
	<b>Total</b>	<b>11</b>	<b>302.67</b>
	<b>Remaining</b>		<b>1197.33</b>

Questions?