Mechanical Hip Prosthetic Horizon Hip

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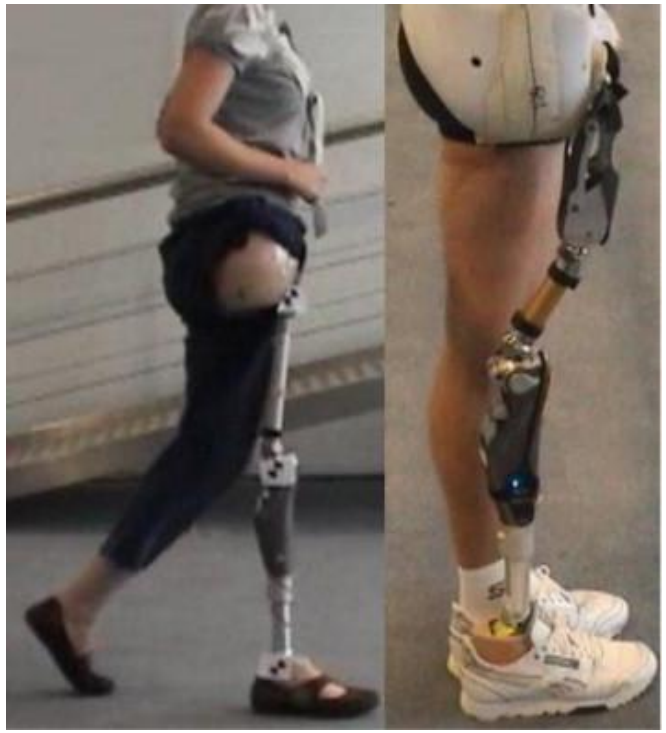
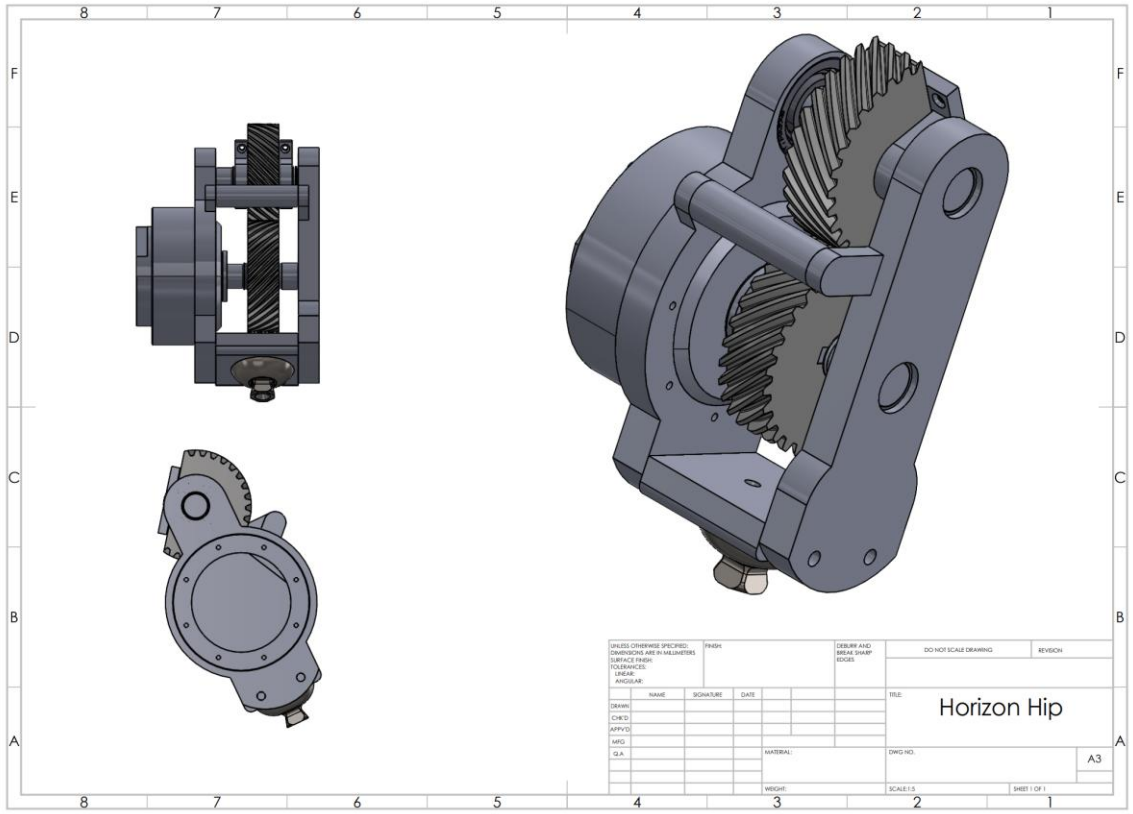
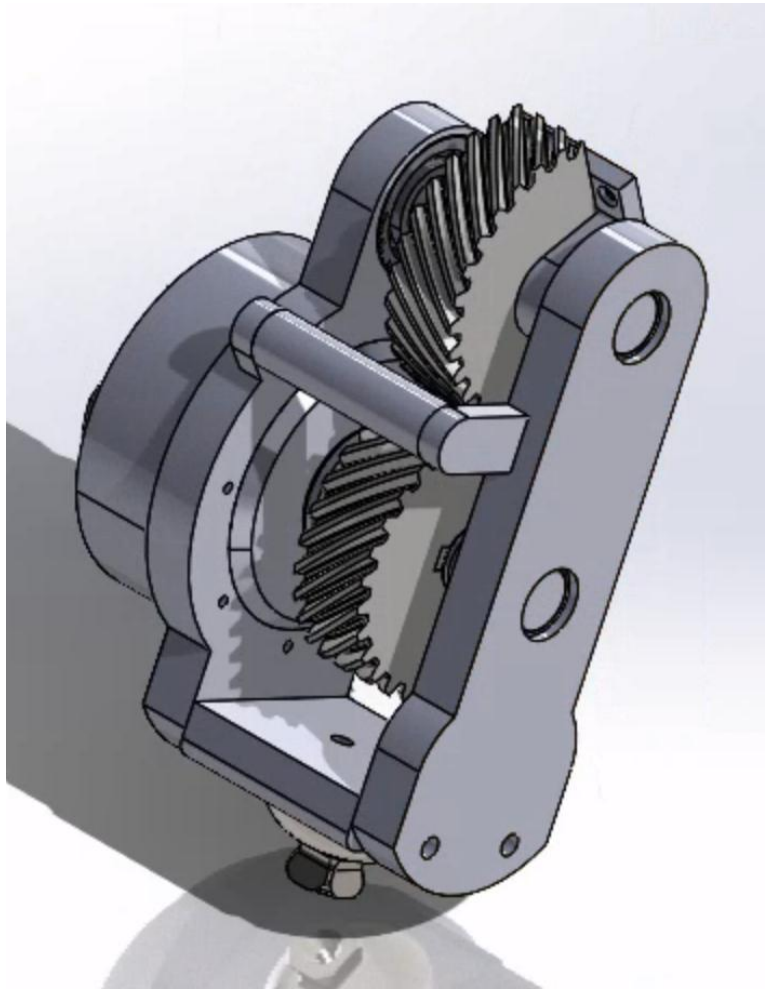
Background

- Designing an active hip prosthetic for 1% of amputees with hip disarticulation or hemipelvectomies
- Current market only offers passive solutions
- Must support 90kg individual, mimic hip flexion and extension

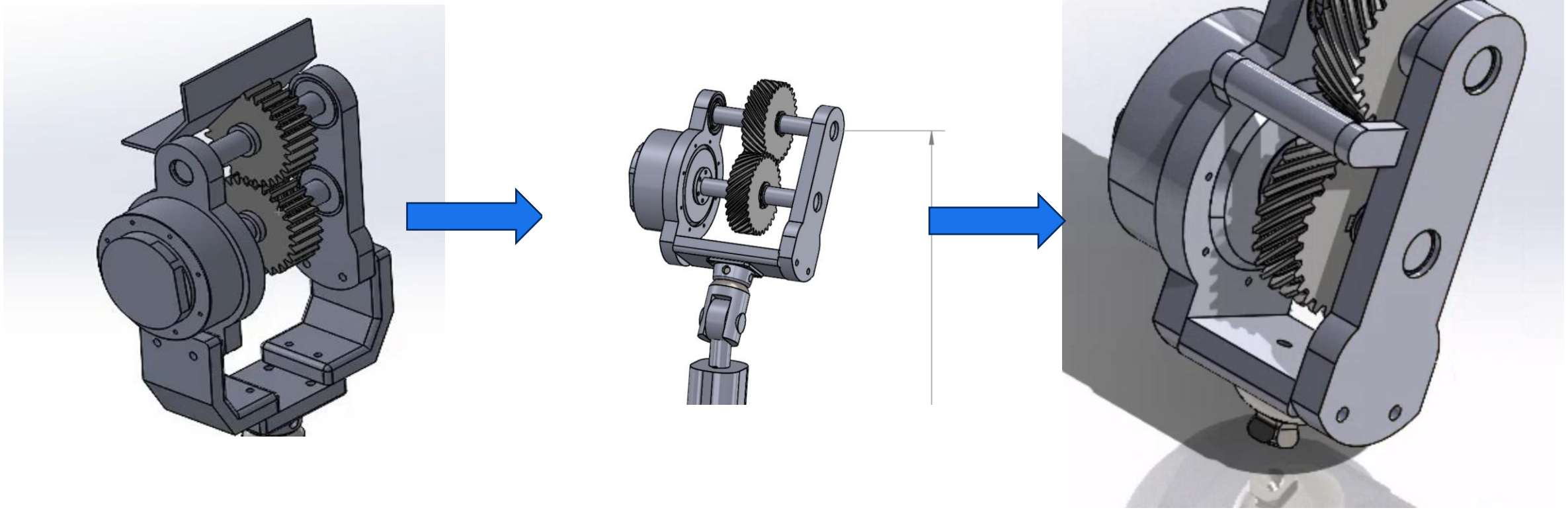


Design Efforts - CAD

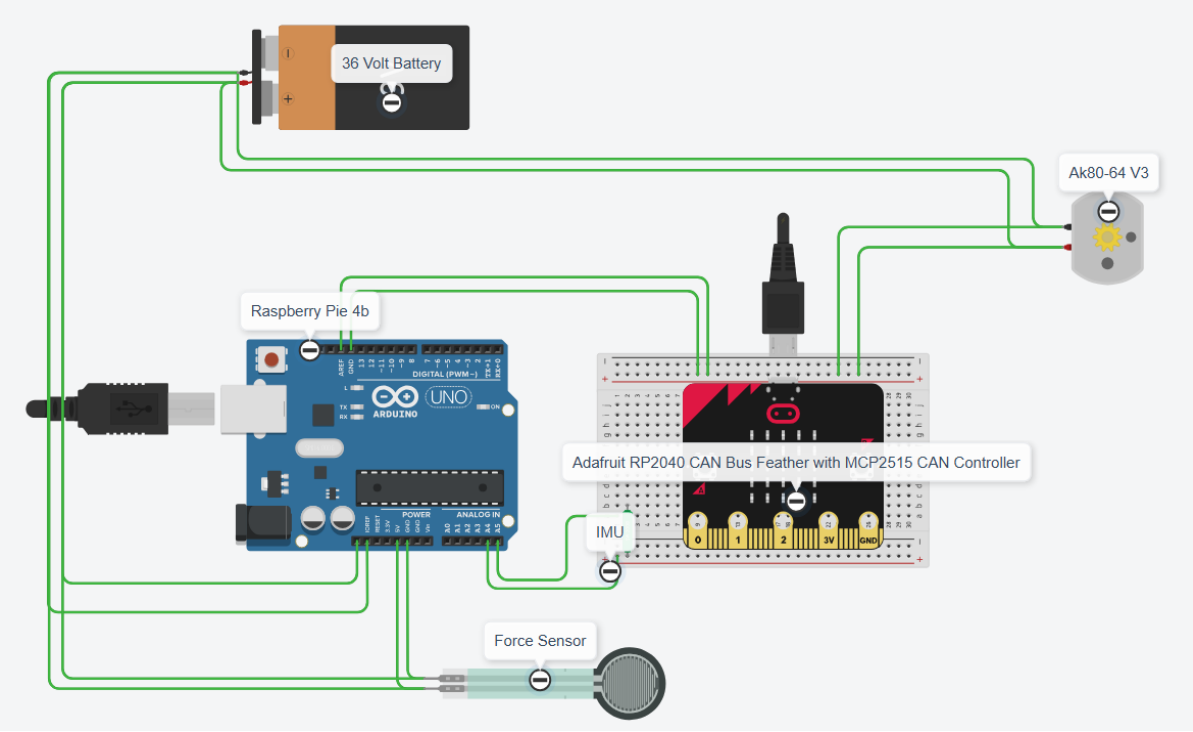


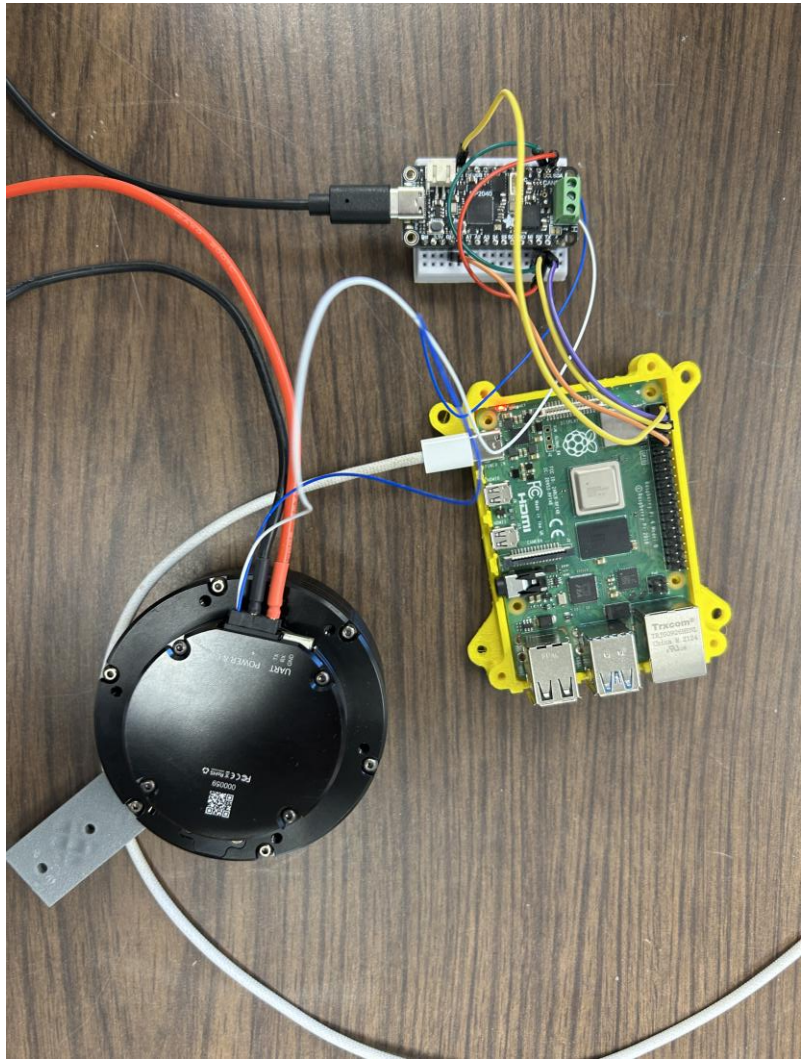


Design Efforts - CAD

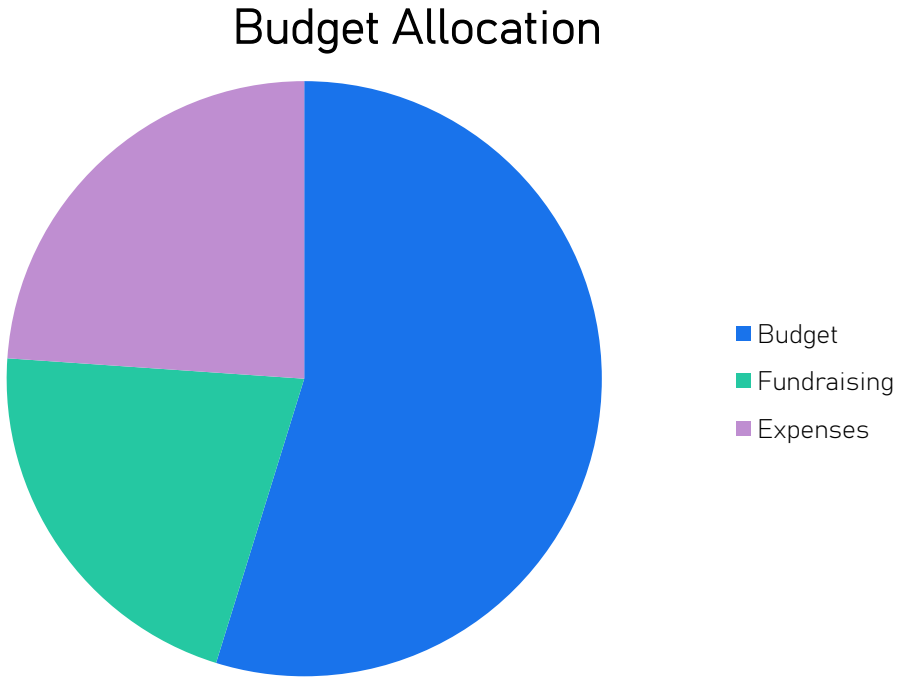


Design Efforts - Electrical





Purchasing Plan – Budget



Budget Overview

Budget		$ 4,500.00		
Fundraising		$ 1,750.00	* Not included in final balance	
Expenses		$ 1,963.60		
Available Balance		**$ 2,536.40**		

FUNDRAISING LOG

Date	Source	Amount ($)	Type	Notes
Pending	i-Corp Aspire Course	$ 3,000.00	Monetary	**On hold, not included**
10/29/2025	NextStep Prosthetics	$ 1,500.00	In-Kind	Physical Lower Leg
11/5/2025	NextStep Prosthetics	$ 50.00	In-Kind	3D Printing
11/24/2026	Professor Willy	$ 200.00	In-Kind	Loaned 3D Printer and donated roll of filament for prototyping

EXPENSE LOG

Date	Item	Amount ($)	Vendor	Notes
PURCHASED				
10/27/2025	Adapter	$ 3.21	NAU Surplus	
10/27/2025	Micro HDMI cable	$ 31.81	BestBuy	
11/14/2025	AK80-64 Kv80 Motor	$ 911.77	CubeMars	With driver board. Discount code
11/14/2025	RUBIK Link V2.0	$ 40.00	CubeMars	Dicount coude
11/18/2025	CAN Bus HAT	$ 39.99	Waveshare	
11/25/2025	36V Battery	$ 32.83	Amazon	
11/26/2025	Battery Adapter	$ 5.82	Amazon	
12/2/2025	Customs Fee	$ 395.93	DHL	:(
1/23/2026	CAN Controller	$ 19.95	Adafruit	
1/23/2026	MicroSD Card	$ 27.38	Adafruit	x2
1/23/2026	IMU Sensor	$ 49.90	Adafruit	x2
1/23/2226	Shipping + Tax	$ 15.13	Adafruit	
1/23/2026	Power Supply	$ 67.99	Amazon	0-60V, 0-5A
1/23/2026	Jumper Wire kit	$ 10.99	Amazon	
1/23/2026	Bolt+Screw Kit	$ 15.98	Amazon	
1/23/2026	USB to USB C	$ 7.75	Amazon	
1/23/2026	USB C to USB C	$ 5.99	Amazon	
1/23/2026	Tax	$ 10.20	Amazon	
1/23/2026	Male Pyramid Adapter	$ 35.35	Ebay	Includes fasteners
1/23/2026	M3x20 Countersunk	$ 5.66	Home Depot	20 pack
1/30/2026	Bearings	$ 20.26	Zoro	x3
1/30/2026	Gears, R&L	$ 154.08	MRO Supply	
30-Jan	Adapter Cable [Xt^)-XT30(	$ 55.63	RJXHobby	shipping :(

Hip Prosthetic Bill of Materials

* TBO = To Be Ordered

Category	Item No	Description	Primary Vendor	Unit Price	Quantity	Make/Buy	Manufacturer	Lead Time	Part Status
Main Assembly	1	AK80-64 KV80 Motor	CubeMars	$ 911.77	1	Buy	CubeMars		In-Hand
Main Assembly	2	Angular Contact Bearing	MiMotion	$ 10.83	3	Buy	Timken	3-4 Weeks	Ordered
Main Assembly	3	10H15L Gear	MRO Supply	$ 70.43	1	Buy	Boston Gears	2-3 Weeks	Ordered
Main Assembly	4	10H15R Gear	MRO Supply	$ 70.43	1	Buy	Boston Gears	2-3 Weeks	Ordered
Main Assembly	5	Upper Shaft	TBD	Custom	1	Buy			TBO
Main Assembly	6	Lower Shaft	TBD	Custom	1	Buy			TBO
Main Assembly	7	Retaining Ring	DSR	$ 3.11	2	Buy	Hillman	1 Week	In-Hand
Main Assembly	8	Shaft Key	McMaster-Carr		2	Buy		3-4 Weeks	TBO
Main Assembly	9	Frame (Motor Side)	McMaster-Carr	$ 46.01	1	Make		3-4 Weeks	TBO
Main Assembly	10	Frame (Bearing Side)	McMaster-Carr	$ 31.55	1	Make		3-4 Weeks	TBO
Main Assembly	11	Mounting Bracket	McMaster-Carr	$ 21.83	1	Buy		3-4 Weeks	TBO
Main Assembly	12	Bottom Bracket	McMaster-Carr	$ 16.02	1	Make		3-4 Weeks	TBO
Main Assembly	13	Male Pyramid Adapter	Ebay	$ 25.00	1	Buy		N/A	Ordered
Main Assembly	14	Structure Enforcing Bar	McMaster-Carr		1	Make		3-4 Weeks	TBO
Hardware	15	M6-1x25 Bolt	HomeDepot	$ 3.75	4	Buy	Everbilt	1 Week	Ordered
Hardware	16	M6-1x20 Connector Bolt	Amazon	$ 0.89	2	Buy	ACCU	10 days	Ordered
Hardware	17	M3x12 Socket Cap Head Screw	Amazon	$ 0.23	8	Buy	ACCU	10 days	Ordered
Hardware	18	M4x10 Socket Cap Head Screw	Amazon	$ 0.24	6	Buy	ACCU	10 days	Ordered
Hardware	19	M6x15 Countersunk Screw	Amazon	$ 0.84	2	Buy	ACCU	10 days	Ordered
Hardware	20	M3x20 Countersunk Screw	Amazon	$ 0.68	4	Buy	ACCU	10 days	Ordered
Electronics	21	Power Supply | 60 V, 5A	Amazon	$ 71.99	1	Buy	Jesverty	5 days	Ordered
Electronics	22	Raspberry Pi	Adafruit	$ 49.50	1	Buy	Adafruit	2 Weeks	TBO
Electronics	23	Adafruit CAN Controller	Adafruit	$ 19.95	1	Buy	Adafruit	2-3 Weeks	Ordered
Electronics	24	MicroSD Card	Adafruit	$ 13.69	2	Buy	Adafruit	2-3 Weeks	Ordered
Electronics	25	Buck Converter	Amazon	$ 15.99	1	Buy	YABOANG	1 Week	Ordered
Electronics	26	Breadboard Jumper Wire	Amazon	$ 10.99	1	Buy	TODOELEC	5 days	Ordered
Electronics	27	IMU Sensor	Amazon	$ 6.99	2	Buy	HiLetgo	5 days	Ordered
Electronics	28	USB-C to USB-C	Amazon	$ 5.00	1	Buy	Orseoose	5 days	Ordered
Electronics	29	USB to USB-C	Amazon	$ 7.99	1	Buy	Basesailor	5 days	Ordered
Electronics	30	RUBIK Link V2.0	CubeMars	$ 40.00	1	Make	CubeMars		In-Hand
Electronics	31	CAN Bus HAT	Waveshare	$ 39.99	1	Buy	Waveshare		In-Hand
Electronics	32	36V Battery	Amazon	$ 32.83	1	Buy	Amazon		In-Hand
Electronics	33	Battery Adapter	Amazon	$ 5.82	1	Buy	Amazon		In-Hand
Electronics	34	Adapter	NAU Surplus	$ 3.21	1	Buy	N/A		In-Hand
Electronics	35	Micro HDMI cable	BestBuy	$ 31.81	1	Buy	Best Buy		In-Hand

Total Parts:	61
Total Purchased:	84%
Total In-Hand:	15%

Purchasing- Manufacturing Plan

- Waiting on material purchase and advanced shop training completion :/

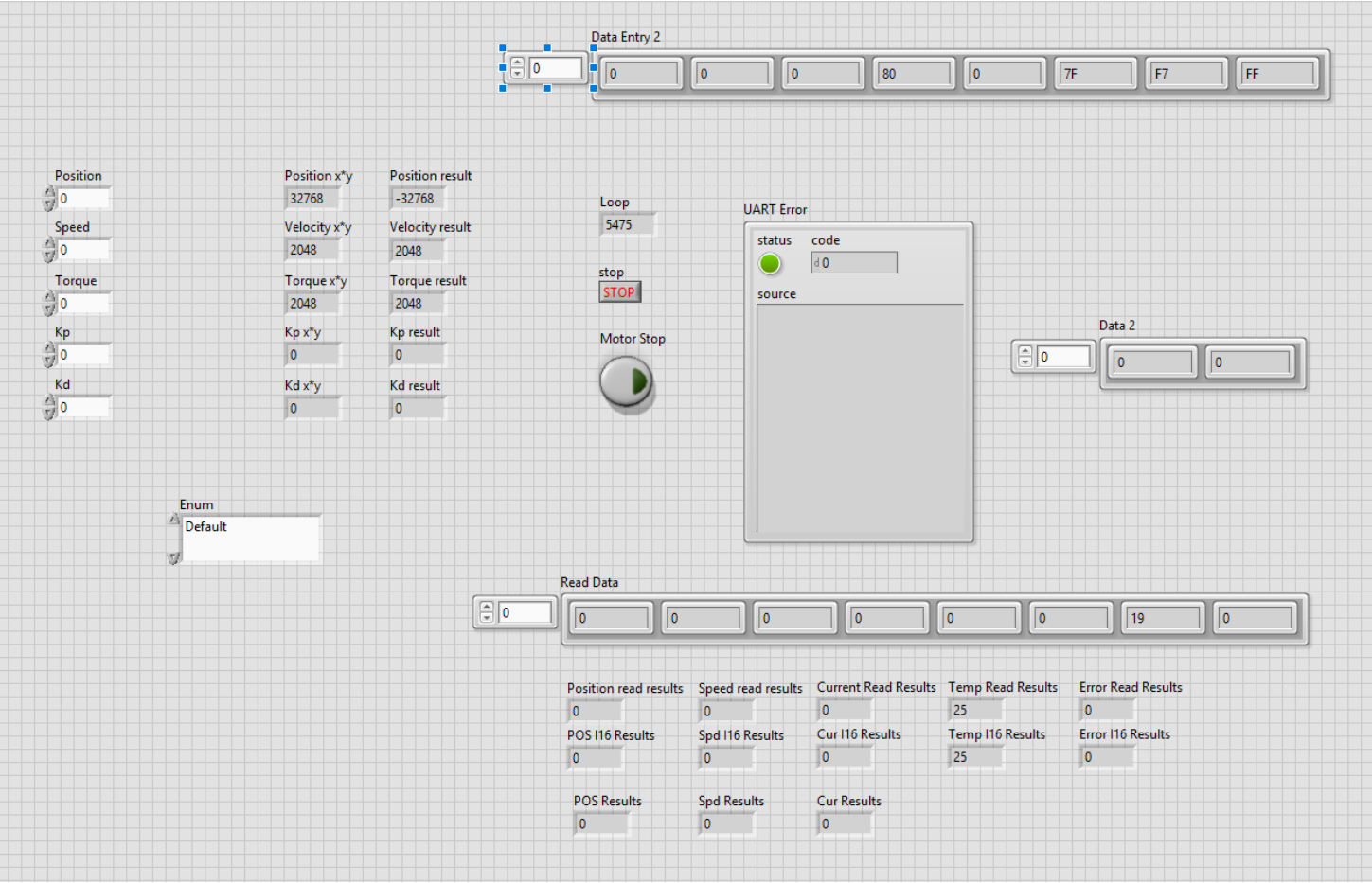
Hip Prosthetic Bill of Materials [MANUFACTURING]

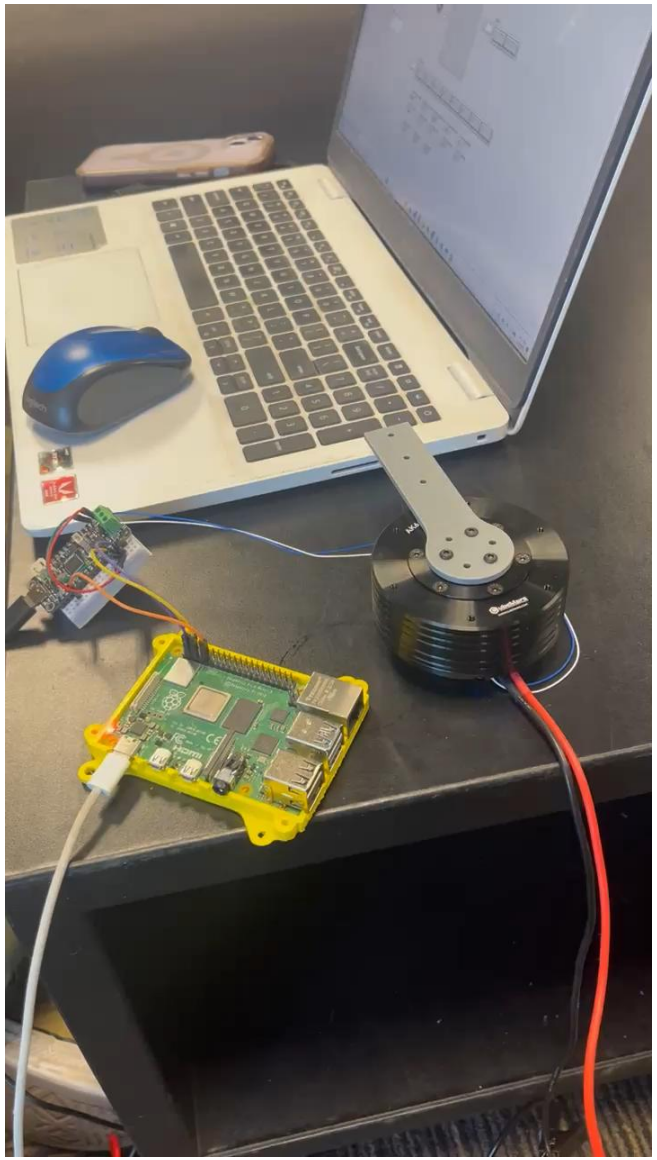
Category	Item No	Description	Primary Vendor	Location	Quantity	Machinist	Process	Part Status
Main Assembly	9	Frame (Motor Side)	McMaster-Carr	NAU Machine Shop	1	Matt	Mill	TBO
Main Assembly	10	Frame (Bearing Side)	McMaster-Carr	NAU Machine Shop	1	Matt	Mill	TBO
Main Assembly	12	Bottom Bracket	McMaster-Carr	NAU Machine Shop	1	Quinn	Mill	TBO
Main Assembly	14	Structure Enforcing Bar	McMaster-Carr	NAU Machine Shop	1	Quinn	Mill	TBO
Main Assembly	5	Upper Shaft	TBD	NAU Machine Shop	1	Aiden	Lathe	TBO
Main Assembly	6	Lower Shaft	TBD	NAU Machine Shop	1	Victoria	Lathe	TBO
Main Assembly	11	Mounting Bracket	McMaster-Carr	NAU Machine Shop	1	Matt/Quinn	Mill	TBO

* TBO = To Be Ordered

Total Parts:	7
Total Purchased:	0
Total In-Hand:	0

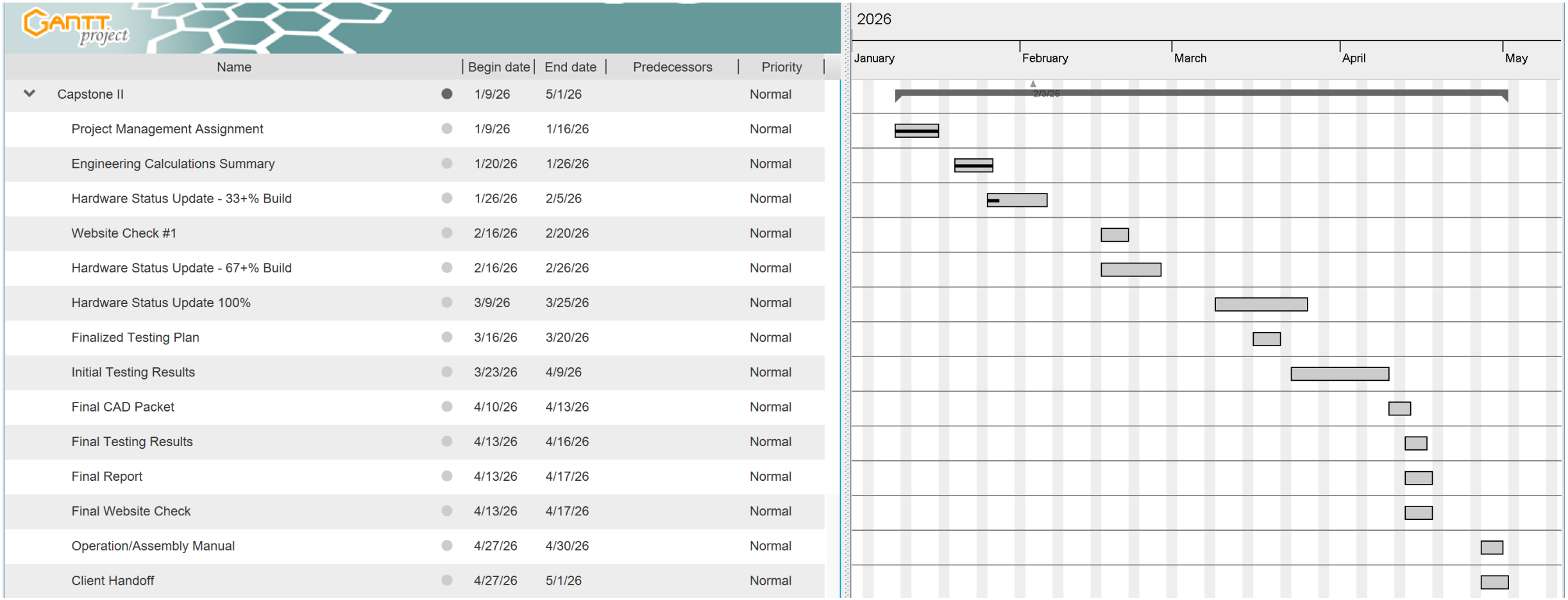
Demonstration





Backup Video

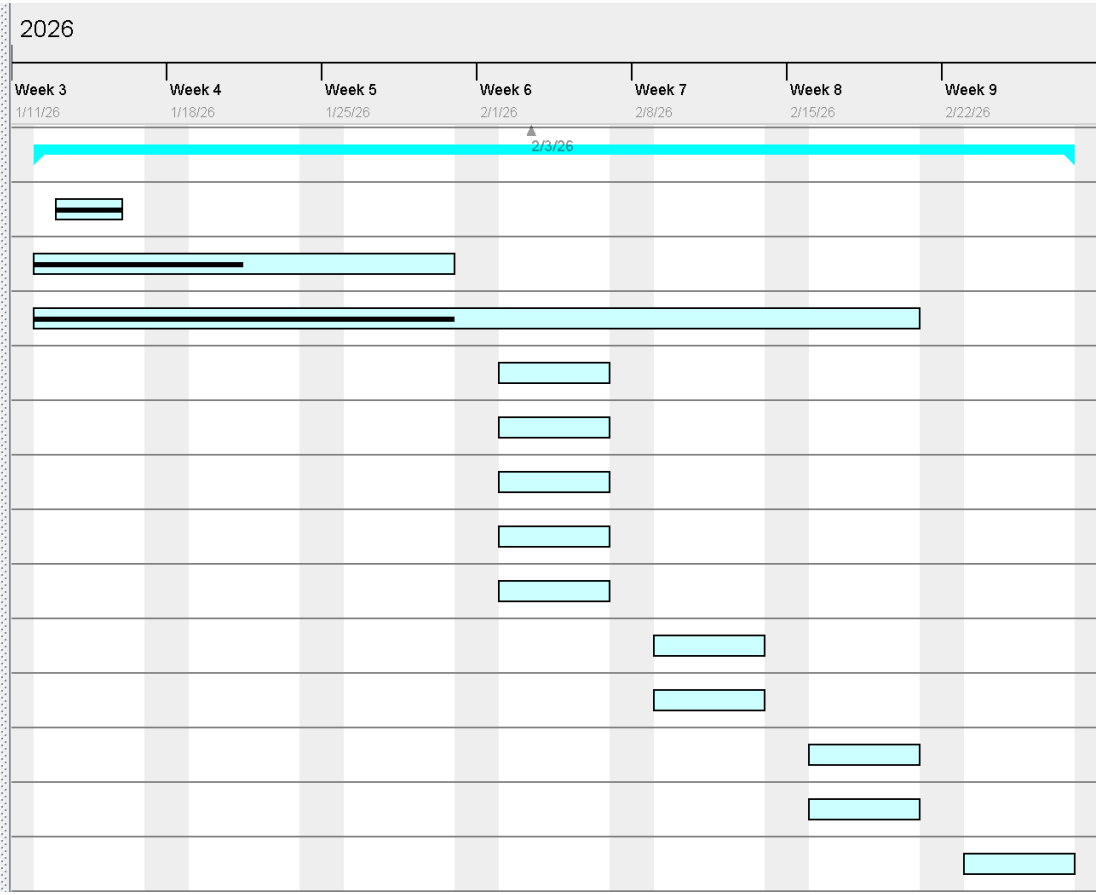
Gantt Chart



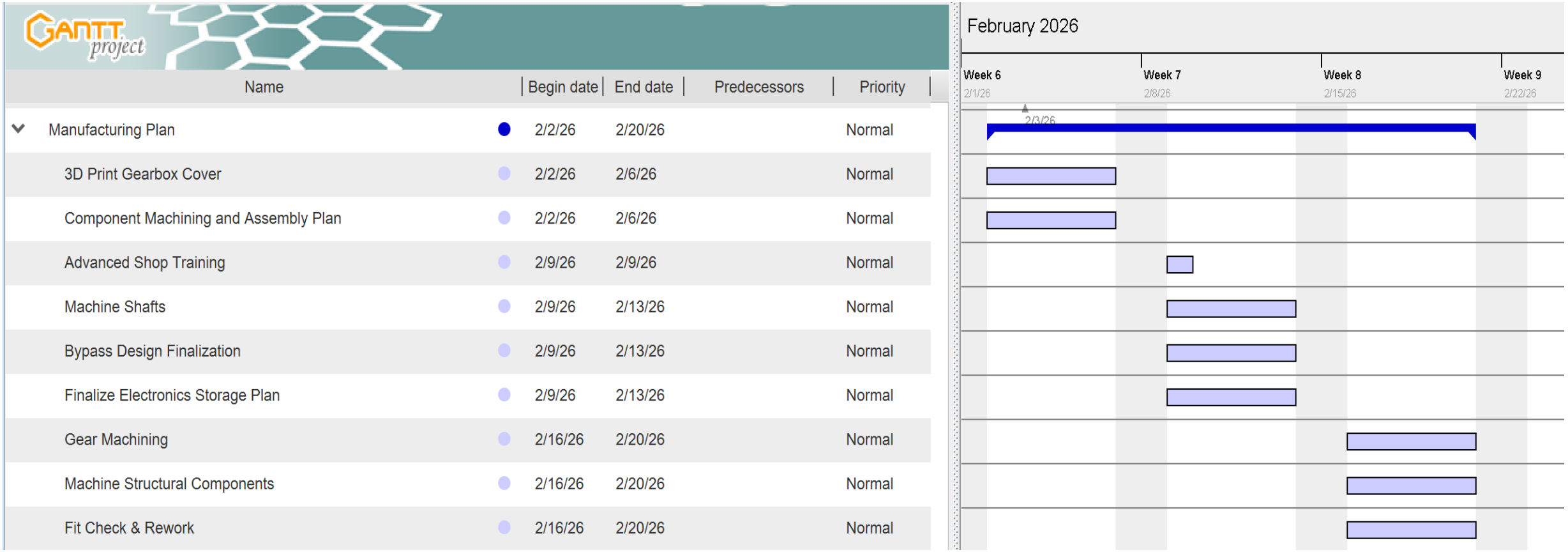
Name	Begin date	End date	Predecessors	Priority
Capstone II	1/9/26	5/1/26		Normal
Project Management Assignment	1/9/26	1/16/26		Normal
Engineering Calculations Summary	1/20/26	1/26/26		Normal
Hardware Status Update - 33+% Build	1/26/26	2/5/26		Normal
Website Check #1	2/16/26	2/20/26		Normal
Hardware Status Update - 67+% Build	2/16/26	2/26/26		Normal
Hardware Status Update 100%	3/9/26	3/25/26		Normal
Finalized Testing Plan	3/16/26	3/20/26		Normal
Initial Testing Results	3/23/26	4/9/26		Normal
Final CAD Packet	4/10/26	4/13/26		Normal
Final Testing Results	4/13/26	4/16/26		Normal
Final Report	4/13/26	4/17/26		Normal
Final Website Check	4/13/26	4/17/26		Normal
Operation/Assembly Manual	4/27/26	4/30/26		Normal
Client Handoff	4/27/26	5/1/26		Normal

Gantt Chart

Name	Begin date	End date	Predecessors	Priority
Controls	1/12/26	2/27/26		Normal
Control Plan Creation	1/13/26	1/15/26		Normal
Motor Actuation	1/12/26	1/30/26		Normal
Sensor Research	1/12/26	2/20/26		Normal
Transfer Actuation Progress to AK80-64	2/2/26	2/6/26		Normal
Identify Inital Control Approaches and Framework	2/2/26	2/6/26		Normal
Background IMU Info + Understanding	2/2/26	2/6/26		Normal
Position Impedance Controls	2/2/26	2/6/26		Normal
Motor E-Stop Circuit Developement	2/2/26	2/6/26		Normal
Define Communications Framework to Implement Multiple Acti...	2/9/26	2/13/26		Normal
Sit-to-Stand Program With Position Controller and IMU	2/9/26	2/13/26		Normal
Implement Sensors	2/16/26	2/20/26		Normal
Program Stand-to-Sit	2/16/26	2/20/26		Normal
Refine Aspects (If Necessary)	2/23/26	2/27/26		Normal



Gantt Chart



Name	Begin date	End date	Predecessors	Priority
Manufacturing Plan	2/2/26	2/20/26		Normal
3D Print Gearbox Cover	2/2/26	2/6/26		Normal
Component Machining and Assembly Plan	2/2/26	2/6/26		Normal
Advanced Shop Training	2/9/26	2/9/26		Normal
Machine Shafts	2/9/26	2/13/26		Normal
Bypass Design Finalization	2/9/26	2/13/26		Normal
Finalize Electronics Storage Plan	2/9/26	2/13/26		Normal
Gear Machining	2/16/26	2/20/26		Normal
Machine Structural Components	2/16/26	2/20/26		Normal
Fit Check & Rework	2/16/26	2/20/26		Normal

Next Steps

- Complete advanced machine shop training
- Order / source materials
- Complete additional design components
  - System cover
  - Attachment plate
- Continue electrical testing and design

- Solidify design tolerances
- 3D print full design to ensure machining is feasible

Thank you