Reflection

Project Management

Successes: During this last semester, the team was able to make huge improvements in team communication and gained much success in project management. These successes that the team were able to achieve include:

- Growth in communication and collaboration over all aspects of the project
- Initiation of completing tasks towards projects
- Independent research of potential solutions and discussing validity of options in team meetings

Room for Improvements: Although the team has worked well with one another thus far, there is always room for improvement. The team must be well prepared for this upcoming semester and some of the things that could be improved for project management and team communication include:

- Continued communication enhancement (creation of documents and task management throughout the week)
- More initiative to start tasks early and complete them fully before the due date
- Preparation for different deliverables and using time efficiently when working towards set goals

  Action Items:

  1. **Check-ins/Weekly Meeting -** To further enhance the team's communication, weekly meetings will still be held with check-ins periodically to ensure that each member remains on task, improving project management within the team.
  2. **Motivation/Self-Evaluation -** Managing not only each other's motivation towards completing tasks but our own motivation as well is key to keeping morality high within the team and maintaining a good performance level.
  3. **Plan/Manage Time -** To work towards goals more effectively and efficiently, the team will work to better plan out our weeks as well as manage our time throughout the days towards working on the project, overall improving project management.

Remaining Design Efforts: The team has nearly completed the design process for the spectrometer system and plans to finish near the beginning of the semester. The last few remaining design efforts the team needs to finalize include:

- Optic system or mirror layout of the design to accurately diffract the required light spectrum within the given wavelength range (350-2500nm).

Gantt Chart

For the upcoming spring semester, the team created a new Gantt chart, which can be viewed in Figure 1, according to the tentative schedule provided. Each week has been laid out in sections that are color coordinated according to team member(s) designated in completing them. According to the spring semester Gantt chart, the team charter and engineering model summary will be completed within the first few weeks. The team will then finalize optic design and begin production nearing the end of February when we will have our first website check. Testing will be done near the end of March and the final CAD/model will be assembled in the beginning of April. The results from testing as well as the final report will be completed along with the second website check mid-April and the final presentation at

the end of April. The team hopes to then hand off the device for future applications in the beginning of May. If all goes according to plan, the team is sure to complete each assignment in an effective and efficient manner.

Spectral Forest Gantt Chart

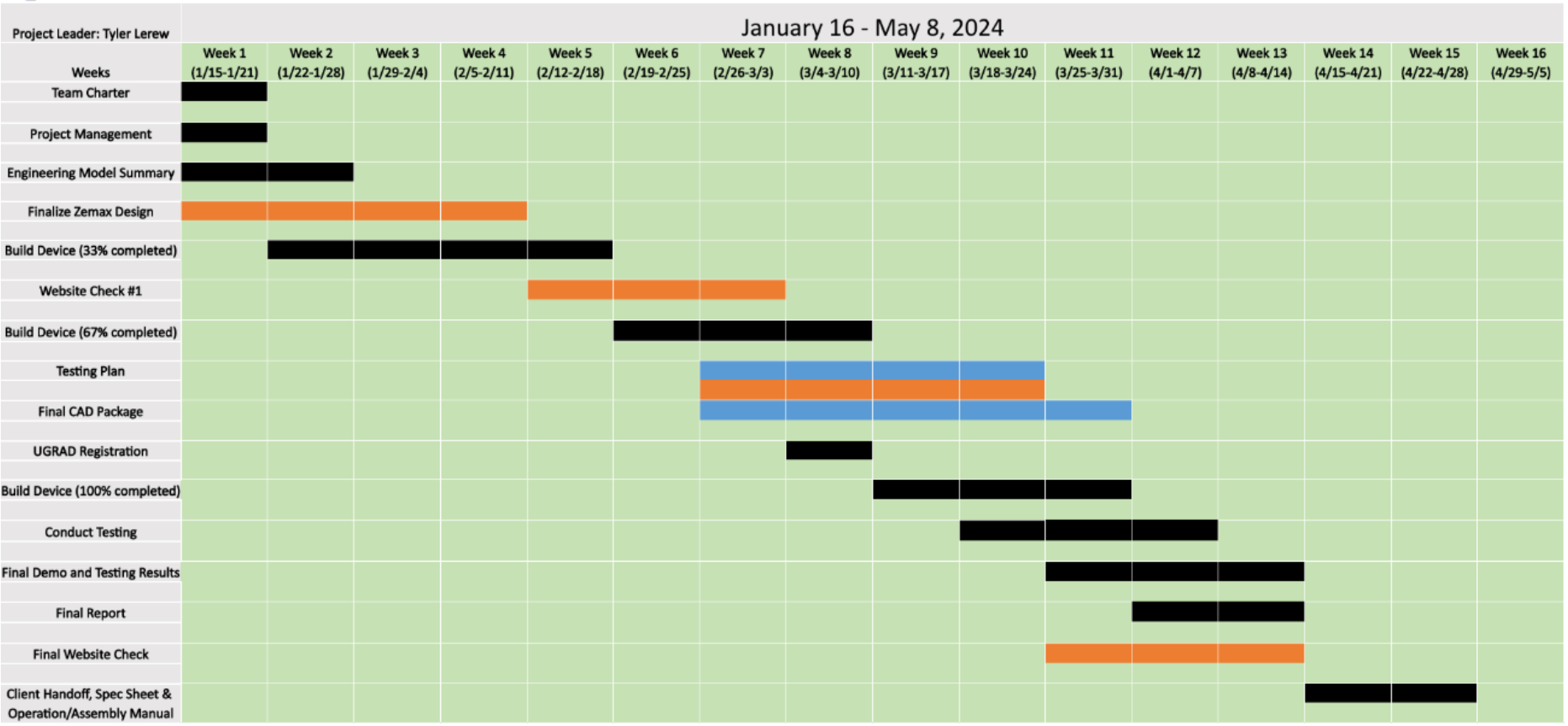

Figure 1: Spring Semester Gantt Chart

Purchasing Plan

Table 1: Bill of Materials

Item #	Item Description	Item Description	Primary Vendor & Part #	Lead Time	Quantity	Cost $	Cost Per unit $	Make/Buy	Weight [oz]	Part status
1	Onyx filament	Micro carbon fiber filled nylon (200 m)	Mark forged	<1 week	1	150-190	.24/cm^3	Purchase	18.3	Not Ordered
2	18-8 Stainless Steel Button Head Hex Drive Screw	8-32 Thread Size, 3/8" Long	Mcmaster-Carr	<1 week	100	7.16	7.16	Purchase	.25	Not Ordered
3	18-8 Stainless Steel Button Head Hex Drive Screw	3-48 Thread Size, 1/2" Long	Mcmaster-Carr	<1 week	100	11.82	11.82	Purchase	.25	Not Ordered
4	18-8 Stainless Steel Flanged Button Head Screw	4-40 Thread, 1/2" Long	Mcmaster-Carr	<1 week	10	7.88	7.88	Purchase	.1	Not Ordered
5	Medium-Strength Steel Coupling Nut	Zinc-Plated, Grade 5, 1/4"-20 Thread Size	Mcmaster-Carr	<1 week	1	5.67	5.67	Purchase	.25	Not Ordered
6	Plastic Submersible Cord Grip	NPT Threads, for 0.39"-0.55" Cord OD, 1/2 Knockout Size	Mcmaster-Carr	<1 week	1	4.99	4.99	Purchase	1	Not Ordered
7	UV-Resistant Thick-Wall PVC Pipe for Water	4 Feet Long, 1/4Pipe Size	Mcmaster-Carr	<1 week	1	13.60	13.60	Purchase	1	Not Ordered
8	18-8 Stainless Steel Coupling Nut	8-32 Thread Size	Mcmaster-Carr	<1 week	1	6.84	6.84	Purchase	1	Not Ordered
9	18-8 Stainless Steel Coupling Nut	3-48 Thread Size	Mcmaster-Carr	<1 week	4	11.00	2.75	Purchase	1	Not Ordered
10	18-8 Stainless Steel Coupling Nut	4-40 Thread Size	Mcmaster-Carr	<1 week	4	13.12	3.28	Purchase	1	Not Ordered
11	Chemical-Resistant Viton® Fluoroelastomer O-Ring	3/16 Fractional Width, Dash Number 362	Mcmaster-Carr	<1 week	1	14.52	14.52	Purchase	.1	Not Ordered
12	Oil- and Abrasion-Resistant Polyurethane O-Ring	3/16 Fractional Width, Dash Number 347	Mcmaster-Carr	<1 week	1	17.31	17.31	Purchase	.1	Not Ordered
13	Cosine Corrector	25.4mm Dia., 3mm Thick, ISP Optics CaF_2 Infrared (IR) Diffuser	Thor Labs WG41050	<1 week	1	101.03	101.03	Purchase	1.06	Not Ordered
14	Diffraction grating	Richardson Gratings 1200 Grooves, 25 x 25mm, 400nm, Plane Ruled Reflection Grating	Thor Labs GT25-12	<1 week	1	124.60	124.60	Purchase	0.96	Not Ordered

15	Collimator	25.4mm Dia. x 25.4mm FL, VIS-NIR Coated, Plano-Convex Lens	Edmund optics #62-599	<1 week	1	47.00	47.00	Purchase	1	Not Ordered
16	Focusing mirror	25mm Dia. x 25mm FL Protected Aluminum, Concave Mirror	Edmund optics #43-465	<1 week	1	46.00	46.00	Purchase	1	Not Ordered
17	Collimator Lens Mount	SM1-Threaded Kinematic Mount for Thin Ø1" Optics	Thorlabs KM100T	<1 week	1	76.27	76.27	Purchase	3.84	Not Ordered
18	Kinematic Rectangular Optic Mounts	Kinematic Mount for 1/2" Tall Rectangular Optics, Right-Handed, 8-32 Tap	Thorlabs KM05S	<1 week	1	78.33	78.33	Purchase	3.84	Not Ordered
19	Silicone	Chip Quik Electronic Grade Silicone	Digi Key	<1 week	1	4.95	4.95	Purchase	.5	Not Ordered
20	USB-C Rubber Seal	Würth Elektronik CONN COVER FOR USB-C	Digi Key #732-11387-ND	<1 week	1	.63	.63	Purchase	.1	Not Ordered
21	Plasti Dip	11 oz. White General Purpose Rubber Coating Spray	Home Depot	<1 week	1	8.98	8.98	Purchase	.5	Not Ordered
22	Plasti Dip Flexible	Protective Rubber Coating Black 11oz Spray Paint	Walmart	<1 week	1	7.88	7.88	Purchase	.5	Not Ordered
23	Foam	Fill PVC pipe so only air can pass through and nothing else	McMaster-Carr	<1 week	1	14.69	14.69	Purchase	.1	Not Ordered
24	Latex balloon	Will be attached inside box to PVC pipe	Walmart	<1 week	1	1.00	1.00	Purchase	.1	Not Ordered
25	Silica pellets	Will be inside box to absorb any moisture in the air	McMaster-Carr	<1 week	1	8.84	8.84	Purchase	0.21	Not Ordered

Action Items:

1. **Identify similar items to be purchase together** – This is self-explanatory, looking at the BOM the team will identify what items fall into similar categories and should be purchased together for easy of assembly when the time comes.
2. **Creating a strict plan for purchasing** – The team will develop a plan like a Gantt Chart for when every item in the BOM will be purchased. Due to the uniqueness of our project, we are getting most of our items purchased through the space grant so we will work over winter break to finalize the BOM and send that list over to be purchased all at once. When the semester starts,

we will hopefully have all the items that we will need to complete our project so we can spend most of our time testing and making any necessary changes. This way we will have plenty of time to acquire new parts and implement them into the device.

Manufacturing Plan

Action Items:

1. **Assign assembly roles and a timeline** – Again due to the uniqueness of this project we will not be manufacturing anything ourselves we will be having someone else print our box and purchase everything else needed to complete our device. We will define who will assemble each part of the assembly which will most likely be just one or two members as the device is not very complex. The assembly will be one very tight schedule many weeks ahead of ME 486C so we have to time to make sure it works and if not, we will have time to make a correction and implement it.