

Meeting Minutes 9/10/2019

Present: Maggi Laan, Kyle Yates, Michael Nyung, Amani Al Fulaiti

- Meetings at 2:30 on Tuesday, Thursday
 - Tuesday at 2:30 with Dev (TBD)
 - Bring draft contract
- Need one team member to type an agenda-Kyle
 - Send out to team members, lead instructor, mentor
 - Initial meeting with descriptions of individual responsibilities
 - Send out agenda on the day before team meetings
- Check with Dev to check on client information
- Created a working draft of Team Contract to be reviewed at Initial meeting with team instructor
 - Assigned roles/responsibilities
 - Went over team expectations
- Discussion about abilities and filled out Teaming Table
- Come to initial meeting with ideas for implementation/review literature/some background information
- Team name: Rumenators

Action Items

Create Agenda (Kyle)

Client Contact:

Budget/Finance (Amani): on hold

Lab Space/Shop Space: ask Dev on Tuesday

Background Research

Pumps?

Cheapest?

5 questions the client at first meeting (T/R)

How can you use your background to help this project?

Roles

Recorder (Maggi)

Wiki (Michael)

Client Contact (Kyle)

Agenda (Kyle)

Budget (Amani)

Project Manager (Michael)

Progress Tracking

What will be done if aspects of the project are slipping?

Put more people on the progress to mitigate lost time

First Instructor Meeting-Minutes

Location: JML 71B

Date: 9/17/2019

Time: 2:30 PM-3:15 PM

Attendees: Dev Shrestha, Chad Dunkel, Amani Al Fulaiti, Kyle Yates, Maggi Laan, Michael Nguy

Agenda items

1. Become familiarized with project, receive background information from Lead Instructor and mentor
2. Each team member brought three to five questions for the lead instructor and mentor

Business

1. Project Background:
 - a. Client wants a more optimized anaerobic digester
 - b. Will include four temperature and pH controlled chambers which carry out the four stages of AD
 - i. Needs to be capable of bypassing chambers
 - c. Success of project based on final methane production
 - d. Retrofit to current bioreactor
 - e. Bench scale chambers, about 1 liter in size, prototype can be plexiglass
 - f. Needs to be automated by microcontrollers
 - i. Arduino, Raspberry Pi, etc.
 - g. Continuous process, capable of recycle in chambers to optimize growth rate
 - h. Digestion time depends on temperature
 - i. In city sized reactors, hydraulic retention time is about one day
 - i. Algae species: look for what is used in wastewater treatment plants
2. Anaerobic Digestion Background by UI Extension will be posted on Shared Drive
3. Potential Resources
 - a. Dr. Sarah Wu, BE
 - b. Dr. Erik Coats, Civ.E

Action items	Owner(s)	Deadline	Status
Research microcontrollers	Michael, Amani	9/24/2019	In Progress

Action items	Owner(s)	Deadline	Status
Research anaerobic digestion steps	Kyle, Maggi	9/24/2019	In Progress
Look at the larger picture of anaerobic digestion of algae (i.e. wastewater treatment)	All	9/24/2019	In Progress

9/19 Meeting-Minutes

Location: Uldaho Library
Date: 9/19/2019
Time: 2:30 PM-3:15 PM
Attendees: Amani Al Fulaiti, Kyle Yates, Maggi Laan, Michael Nguy

Agenda items

1. Draft Fall/Spring Budget Items

Business

1. Group draft of budget items as a group to turn in
 - a. Find draft budget on OneDrive for specifics

Action items	Owner(s)	Deadline	Status
Research microcontrollers	Michael, Amani	9/24/2019	In Progress
Research anaerobic digestion steps	Kyle, Maggi	9/24/2019	In Progress
Look at the larger picture of anaerobic digestion of algae (I.e. wastewater treatment)	All	9/24/2019	In Progress

9/24 Meeting-Minutes

Location: JML 71B
Date: 9/24/2019
Time: 2:30 PM-3:15 PM
Attendees: Amani Al Fulaiti, Kyle Yates, Maggi Laan, Michael Nguy, Dev Shrestha

Agenda items

1. Questions for Lead Instructor

Business

1. Most anaerobic digesters are a single chamber, we are doing four separate chambers
2. Sensors needed: CH₄ gas, temperature, pH, turbidity, electrical conductivity, pressure
3. Continuous (every few minutes) data acquisition by computer
4. Mixing capabilities: magnetic stir bar, small motorized stirrer
5. Product Design Requirements due 9/26

Action items	Owner(s)	Deadline	Status
Research microcontrollers	Michael, Amani	9/26/2019	In Progress
Research anaerobic digestion steps	Kyle, Maggi	9/26/2019	In Progress
Look at the larger picture of anaerobic digestion of algae (I.e. wastewater treatment)	All	9/26/2019	In Progress
Come to next meeting with PRD specifications	All	9/26/2019	

10/8 Minutes

Location: JML 71B
Date: 10/8/2019
Time: 2:30 PM-3:30 PM
Attendees: Dev Shrestha, Amani Al Fulaiti, Kyle Yates, Maggi Laan, Michael Nguy

Agenda items

1. Ask questions from 10/3 team meeting
2. Go over project schedule
3. Go over budget

Business

1. Questions:
 - a. Where to buy cylinders: keep looking online
 - b. Inoculation port with syringe for initial inoculation with waste
 - c. Hydrolysis: fermentable sugar sensor?
2. See Product Schedule on OneDrive for updated document
3. See Budget on OneDrive for updated version
 - a. Would like to begin ordering supplies by end of October, and assembling by November

Action items	Owner(s)	Deadline	Status
Update Portfolio	Maggi	10/10/2019	In Progress
CAD Drawings	Kyle, Maggi	10/15/2019	In Progress
Do HRT calculations	Maggi	10/10/2019	In Progress
Continue to research/choose sensors	Michael, Amani	10/15/2019	In Progress

10/1 Meeting-Minutes

Location: JML 71B
Date: 10/1/2019
Time: 2:30 PM-3:15 PM
Attendees: Amani Al Fulaiti, Kyle Yates, Maggi Laan, Michael Nguy, Dev Shrestha, Chad Dunkel

Agenda items

1. Questions for Lead Instructor
2. Show initial design schematic

Business

1. Research pH, temperature, and time spent in the four chambers of a compound stomach
2. To calculate expectant flow, need to know volume and hydraulic retention time
3. To deal with constant maintenance of pH sensor, could have sampling port
4. At next meeting on 10/3, update PRD and budget

Action items	Owner(s)	Deadline	Status
Continue to research pH, temperature, pressure, CO ₂ sensors For budget updates	Michael, Amani	10/3	
Begin to solidify design for digester for PRD	Kyle, Maggi	10/3	

10/3 Minutes

Location: UI Library
Date: 10/3/2019
Time: 2:30 PM-3:30 PM
Attendees: Amani Al Fulaiti, Kyle Yates, Maggi Laan, Michael Nguy

Agenda items

1. Update Product Requirements Document
2. Update budget to include sensor information

Business

1. See Product Requirements document for updated version
2. See Budget for updated version
 - a. Would like to begin ordering supplies by end of October, and assembling by November
3. Questions for Tuesday meeting
 - a. Where do we buy acrylic/plexiglass cylinders?
 - b. Why do we need bi-directional pumps if the algae is inoculated at the beginning of the process?
 - c. Methane probe v gas bag
 - d. Triple SMA connectors

Action items	Owner(s)	Deadline	Status
Finish Pump calculations	Maggi	10/8/2019	In Progress
Research compound stomachs	Kyle, Maggi	10/8/2016	In Progress
Do HRT calculations	Maggi	10/8/2019	In Progress

10/17 Minutes

Location: Library
Date: 10/17/2019
Time: 2:30 PM-3:30 PM
Attendees: Kyle Yates, Maggi Laan, Michael Nguy

Agenda items

1. Work on DVP
2. Pump logistics

Business

1. Work on DVP
 - a. Find on OneDrive
 - b. Still need to add due dates from schedule
 - c. Want ten requirements, need to add four more
2. Discussed Peristaltic Pump logistics
 - a. Build using step motor and 3D print

Action items	Owner(s)	Deadline	Status
HRT/Pump Calculations	Maggi	10/22/2019	In Progress
Chamber Options	Kyle	10/22/2019	In Progress
Assembly of pump plan	Michael	10/22/2019	In Progress
Data flow spreadsheet	Michael, Amani	10/22/2019	In Progress

10/22 Minutes

Location: JML 71B
Date: 10/22/2019
Time: 2:30 PM-3:30 PM
Attendees: Kyle Yates, Maggi Laan, Amani Al-Fulaiti, Dev Shrestha

Agenda items

1. Further questions about project

Business

1. How to control magnetic stirrer from arduino
2. Use gas bags to characterize production
3. Does not recommend 3D print of peristaltic pump
4. DVP language needs to be able to be quantified
5. Research on design fit
 - a. Tolerances
 - b. Threading technique
 - c. Drilling technique

Action items	Owner(s)	Deadline	Status
HRT/Pump Calculations	Maggi	10/29	In Progress
Bucket for prototype	Kyle	11/5	In Progress

10/29 Minutes

Location: Library
Date: 10/29/2019
Time: 2:30 PM-3:30 PM
Attendees: Kyle Yates, Maggi Laan, Michael Nguy,

Agenda items

1. Discuss next steps for prototype

Business

1. Discuss peristaltic pumps
 - a. Michael-bring code for next meeting
2. Showed progress with OnShape model-Maggi
3. Need to update budget as we finalize prototype
4. Work on value proposition

Action items	Owner(s)	Deadline	Status
OnShape Model	Maggi	11/5	In Progress
Obtain bucket for prototyp	Kyle	11/5	In Progress
Code for 3D pump print	Michael	10/22/2019	In Progress
Value proposition	Maggi	10/31	In Progress
Itemized list of purchases to make	Everyone	11/5	In progress

11/5 Minutes

Location: JML 71 B
Date: 11/5/2019
Time: 2:30 PM-3:30 PM
Attendees: Maggi Laan, Michael Nguy, Amani Al-Fulaiti, Dev Shrestha, Chad Dunkel

Agenda items

1. Discuss OnShape model
2. Discuss Wikipage
3. Peristaltic Pumps-3D printing

Business

1. Update Value Proposition to be more specific
 - a. Make it quantifiable and measureable
2. Try to 3D print peristaltic pumps, can order if we need to
 - a. When ordering, have to use an H-Bridge to switch direction of pump
3. Need a float (or some other device) to measure water level in chambers
4. Can potentially use immersion heater for heating instead of heating band or plate
5. Look at using rotary blades instead of magnetic stir plate
6. For design review
 - a. Finish correct 3D model with sensors
 - b. Create block diagram of process
 - c. Include HRT and engineering analysis
 - d. Include other options (pros and cons)

Action items	Owner(s)	Deadline	Status
OnShape Model	Maggi	11/12	In Progress

Schedule design
review time at next
meeting

everyone

Code for 3D pump
print

Michael

11/12

In Progress

Double Check
purchasing list

Everyone

11/12

In progress

Wikipage due

Michael

11/7

11/7 Minutes

Location:	Library
Date:	11/7/2019
Time:	2:30 PM-3:30 PM
Attendees:	Maggi Laan, Michael Nguy, Amani Al-Fulaiti, Kyle Yates

Agenda items

1. Decide on Concept Design Review Date
2. Look at possible sensors to remove
3. Discuss OnShape model
4. Discuss water level sensor

Business

1. Design Review Tasks:
 - a. CAD Drawing: Maggi
 - b. Other options for designs: Maggi
 - c. Block Diagram of process: Kyle
 - d. Budget & Schedule: will update at team meeting next thursday
 - e. Block Diagram for programming: Michael and Amani
 - f. Project Learning
 - g. Design Requirements
 - h. Value Proposition
2. Have design review on 11/19 at 2:30 at EP 425
3. Water Level Sensor
 - a. Use a float or laser sensor
4. At meeting on 11/14
 - a. Update portfolio
 - b. Prepare for concept review
 - c. Decide on pressure release valve and pressure gauge
 - d. Decide on O₂, CO₂, and CH₄ sensors for gas

Action items	Owner(s)	Deadline	Status
OnShape Model	Maggi	11/14	In Progress
Block Diagram- Process	Kyle	11/14	
Block Diagram- Programming	Michael/Amani	11/14	In Progress
Portfolio/Logbooks	Everyone	11/14	In progress

11/12 Minutes

Location:	JML 71 B
Date:	11/12/2019
Time:	2:30 PM-3:00 PM
Attendees:	Maggi Laan, Michael Nguy, Kyle Yates, Dev Shrestha

Agenda items

1. Concept Design Review Clarification
2. Discuss possible sensors

Business

1. Concept Design Review
 - a. Email Judy to reserve room EP 413/EP 425 for 11/19 from 2:30 to 3:30
 - i. Email Dr. Swenson once room is reserved
 - b. For design review
 - i. 20 minute presentation, 40 minutes for questions/discussion
 - ii. Human-Machine Interface overview
 1. What operator will see, options for changing parameters
 - a. Can backfill code later
 - iii. Design Logic
 1. Why we chose:
 - a. Temperature
 - b. Pumping mechanism/recirculation
 - c. All other design aspects
 2. Other design options:
 - a. Need drawings/pros and cons of each
2. Sensor Questions
 - a. Water Level Sensor:
 - i. Possible laser sensor
 - ii. Ultrasonic (ping) sensor
 - b. May remove dissolved oxygen sensor from design
 - c. Pressure sensor needs digital output
 - d. Gas sensors:
 - i. Need some way to mount to top of chamber

- ii. Can bring STL file to 3D print at JML
- iii. Dev gave sensors from previous projects to test
- 3. Tipping Concerns
 - a. Harness/metal fabrication to tie all together
 - b. 3D print base for each chamber

Action items	Owner(s)	Deadline	Status
OnShape Model	Maggi	11/14	In Progress
Block Diagram- Process	Kyle	11/14	
Block Diagram- Programming	Michael/Amani	11/14	In Progress
Portfolio/Logbooks	Everyone	11/14	In progress
Reserve room for design review	Maggi	11/12	
Attend two design reviews	Everyone	11/22	

11/21 Minutes

Location: Library
Date: 11/21/2019
Time: 2:30 PM-3:30 PM
Attendees: Maggi Laan, Michael Nguy, Kyle Yates, Amani Al Fulaiti

Agenda items

1. Assign Action Items for Thanksgiving Break

Business

1. Items that we need to accomplish before the end of the year:
 - a. PVC leak testing
 - b. Process and Instrumentation Diagram
 - c. Decide on heating element
 - i. Boil water in separate chamber then mix with algae water
 1. Must add another chamber for water, lowers total solids in liquid
 - ii. Slowly heat immersion heater
 1. May take a long time to heat
 - iii. Heat air around each chamber
 1. May take a long time to heat, difficult to heat through pvc
 - d. CFD for mixing
 - i. OnShape
 - ii. SolidWorks
 - e. Decide on mixing
 - i. Food processor type blades on bottom of chamber?
 - ii. Use stepper motors to control blade coming from top of chamber

Action items	Owner(s)	Deadline	Status
CFD	Maggi	11/30	In Progress
P&ID	Maggi	11/30	

Heater Options

Kyle

11/30

In Progress

Programming
Diagram

Michael & Amani

11/30

In progress

12/3 Minutes

Location: JML 71B
Date: 12/3/2019
Time: 2:30 PM-3:00 PM
Attendees: Maggi Laan, Kyle Yates, Dev Shrestha

Agenda items

1. Discuss Snapshot
2. Discuss End of Year Deliverables
3. Model Updates/CFD Issues

Business

1. Snapshot Prep
 - a. Modify CDR slides to meet snapshot requirements
 - b. Have a blueprint for the overall process
 - i. Add this to the portfolio as well
2. End of Year Deliverables/Tasks
 - a. Ready to order parts
 - i. Send list via excel file with links
 - ii. Email inoculation port company for specifics on how the port works
 - b. Need to polish WikiPage
 - c. Process and Instrumentation Diagram
3. CFD and Model
 - a. Issues with CFD program, SimScale
 - i. Export to Solidworks and use Flow Simulation
 - ii. Will decide on specific mixing once flow simulation comes back
 - iii. Can determine heating element at this time as well
 - b. 3D printing sensor boxes
 - i. Can recess into PVC cap to create seal
 - ii. Decide on whether to order one or four parts at a time based on confidence in sensors

Action items

Owner(s)

Deadline

Status

CFD	Maggi	12/13	In Progress
P&ID	Maggi	12/13	Continuous Updates
WikiPage-Biologicals	Kyle & Maggi	12/13	In Progress
WikiPage-Electrical	Michael & Amani	12/13	In progress
Inoculation Port- Email	Maggi	12/5	In Progress

12/5 Minutes

Location:	Library
Date:	12/5/2019
Time:	2:30 PM-3:20 PM
Attendees:	Maggi Laan, Kyle Yates, Michael Nguy

Agenda items

1. Discuss Snapshot
2. Discuss End of Year Deliverables
3. Model Updates/CFD Issues

Business

1. Snapshot Prep
 - a. Project Learning-update slides by 12/5 10 pm
 - i. Modeling-Maggi
 - ii. 3D printing pumps-Michael
 - iii. Anaerobic Digestion-Kyle
 - iv. Microcontrollers-Michael
 - v. Choosing sensors-Maggi
 - vi. One chamber prototype-Kyle
 - b. Add P&ID-Maggi
 - c. Add User Interface/Process Diagram-Michael
2. Ordering Parts
 - a. Ready to order parts
 - i. Send list via excel file with links
 - a. Maggi will add to OneDrive
 - i. Michael add sensors/electrical things
 - ii. Maggi add PVC/chamber things
 - ii. Email inoculation port company for specifics on how the port works
 - iii. Hold off on mixing, heating, water level sensor, inoculation port
3. WikiPage
 - a. Maggi & Kyle-Biological Items
 - i. Maggi will start a document on OneDrive to add to with headings, Michael can add to WikiPage

ii. Kyle-send in headshot

Action items	Owner(s)	Deadline	Status
CFD	Maggi	12/13	In Progress
P&ID	Maggi	12/13	Continuous Updates
WikiPage-Biologicals	Kyle & Maggi	12/12	In Progress
WikiPage-Electrical	Michael & Amani	12/12	In progress
Parts list ready to order	everyone	12/10	

12/10 Minutes

Location: JML 71B
Date: 12/10/2019
Time: 2:30 PM-3:20 PM
Attendees: Maggi Laan, Amani Al Fulaiti, Michael Nguy, Dev Shrestha, Chad Dunkel

Agenda items

1. Ordering Parts List
2. Software Updates

Business

1. Ordering Parts List
 - a. Buy one of each sensor to test for now
 - i. Returning items is a difficult process
 - b. Look for hose barb adapter/silicone tubing locally at irrigation stores to account for fit
 - c. Update parts list for what to buy online/how many and what will be found locally
 - d. Heating Element
 - i. Can wait until second semester
 1. 100 W element is probably sufficient
 - e. Mixing
 - i. Will test magnetic plate in one chamber prototype during 2nd semester before making decision
 - f. Inoculation port
 - i. Maggi emailed company, waiting for reply
2. Software Updates
 - a. Before sensors come in, create a flow diagram for logic

Action items	Owner(s)	Deadline	Status
CFD	Maggi	12/13	In Progress

P&ID	Maggi	12/13	Continuous Updates
WikiPage-Biologicals	Kyle & Maggi	12/12	In Progress
WikiPage-Electrical	Michael & Amani	12/12	In progress
Parts list-ready to order, needs a few updates	Maggi	12/10	Should be done 12/10 evening

1/21 Minutes

Location: JML 71B
Date: 1/21/2020
Time: 2:30 PM-3:20 PM
Attendees: Maggi Laan, Amani Al Fulaiti, Michael Nguy, Dev Shrestha, Chad Dunkel

Agenda items

1. Confirm correct parts arrived
2. Semester Refresh

Business

1. Engineering Release Review, due by 2/21
 - a. This is pitching our final design, everything needs to be cleaned up and solid for this
2. Snapshot Day 3 is on 3/6
3. For construction of chambers, Chad should be around
 - a. Can send an email to confirm times/dates for building
 - b. On schedule, first chamber is supposed to be assembled by 1/28
4. To 3D print, need to export model to STL
5. We may be able to buy silicon tubing at chem stores and not just Moscow Building Supply
6. Controls
 - a. Coding is expected to take 1-2 weeks for sensors
 - i. Mixing and heating may be more involved

Action items	Owner(s)	Deadline	Status
One Chamber Prototype Assembled	Maggi & Kyle	1/28	In Progress
Begin writing code for sensors	Michael & Amani	1/28	

1/28 Minutes

Location: JML 71B
Date: 1/28/2020
Time: 2:30 PM-3:20 PM
Attendees: Maggi Laan, Amani Al Fulaiti, Michael Nguy, Dev Shrestha, Chad Dunkel

Agenda items

1. Updates from build

Business

1. Electrical/Sensor Updates
 - a. Display uses both I2C pins
 - b. CH4 sensor: Is outputting data
 - c. CO2: doesn't have a great datasheet online, needs some troubleshooting
 - d. O2: not sure what is being output from the sensor
 - e. Should make a wiring diagram for entire system
2. Chamber construction
 - a. Can bring to facilities, need budget number
 - b. For 3D printing, check size limits in JML printer, may have to go to ME department
3. Still need to choose:
 - a. Water level sensor
 - i. Ultrasonic or etape
 - b. Heating

Action items	Owner(s)	Deadline	Status
One Chamber Prototype Assembled	Maggi & Kyle	2/4	In Progress
Begin writing code for sensors	Michael & Amani	1/28	

Make wiring diagram Michael & Amani 2/4

Compile list of
heater options,
choose heater everyone 1/30

Choose water level
sensor everyone 1/30

1/30 Minutes

Location: JML Shop
Date: 1/30/2020
Time: 2:30 PM-3:20 PM
Attendees: Maggi Laan, Amani Al Fulaiti, Michael Nguy,

Agenda items

1. Work on sensors
2. Choose design review date
3. Update budget
4. Choose water level sensor
5. Choose heater
6. Choose pumps
7. 3D printing cap

Business

1. Sensor Status Excel sheet under project management on drive
 - a. Contains sensor updates and action items
2. Design Review Date
 - a. 2/13/2020 @ 2:30?
3. Budget-updated to include purchased items and future dates of items
4. Water Level Sensor
 - a. Etape 12" sensor
5. Heater
 - a. <https://www.omega.com/en-us/industrial-heaters/immersion-heaters/emh-heater/p/EMH-061-240V>
 - b. https://www.omega.com/en-us/industrial-heaters/immersion-heaters/emh-heater/p/EMH-060-120V?gclid=Cj0KCQiAmsrxBRDaARIsANyiD1qcwiCZ_0EmIM3qRPIHRghThhYvEtiRawEbF1_BUFp_WcrOyBoutltEaAsEkEALw_wcB&gclsrc=aw.ds
6. Pumps
 - a. https://www.adafruit.com/product/3910?gclid=Cj0KCQiAsbrxBRDpARIsAAAnz_01WPPF_OTOCsl-z6OZ420jCYVAmf6VEN1rhfTvzOF0j6AggFFd3FOwaAkrqEALw_wcB
 - b. Need to figure out H-Bridge

7. Should be ready to 3D print next week

Action items	Owner(s)	Deadline	Status
One Chamber Prototype Assembled	Maggi & Kyle	2/4	In Progress
Make wiring diagram	Michael & Amani	2/4	
Order pump, heater, water level sensor	Maggi	2/4	

2/4 Minutes

Location: JML Shop
Date: 2/4/2020
Time: 2:30 PM-3:20 PM
Attendees: Maggi Laan, Kyle Yates, Dev Shrestha

Agenda items

1. 3D printing cap
2. Engineering Release Review

Business

1. Started 3D printing cover
 - a. Downloaded Flashdrive and began printing in computer lab
 - i. Will be done by 2/5
2. Engineering Release Review-2/13
 - a. Dev gone on 2/11
3. Order parts
 - a. Water level sensor
 - b. EC circuit
 - c. H Driver
 - d. Peristaltic Pump
 - e. Hose Barb adapters
 - f. Immersion Heater

Action items	Owner(s)	Deadline	Status
One Chamber Prototype Assembled	Maggi & Kyle	2/13	In Progress
Make wiring diagram	Michael & Amani	2/13	
Finish wiring one chamber prototype	Michael & Amani	2/13	

2/11 Minutes

Location: JML Shop
Date: 2/11/2020
Time: 2:30 PM-4:00 PM
Attendees: Maggi Laan, Kyle Yates, Amani Al-Fulaiti, Michael Nguy

Agenda items

1. Continue to work on project
2. Work on engineering release review

Business

1. Project Work
 - a. Michael & Amani: Finished circuit diagram
 - b. Maggi & Kyle: got 3D cap dimensions from retailer-not helpful, will have to measure ourselves
2. Engineering Release Review-2/18 at 2:30 in EP 413
 - a. Maggi & Kyle: set up powerpoint, assigned slides
3. Order parts
 - a. Relay

Action items	Owner(s)	Deadline	Status
One Chamber Prototype Assembled	Maggi & Kyle	2/20	In Progress
Finish wiring one chamber prototype	Michael & Amani	2/20	
Engineering Release Review	Everyone	2/18	

Try to measure PVC
cap for 3D printing

Maggi & Kyle

2/13

2/13 Minutes

Location: JML Shop
Date: 2/13/2020
Time: 2:30 PM-4:30 PM
Attendees: Maggi Laan, Kyle Yates, Amani Al-Fulaiti, Michael Nguy

Agenda items

1. Continue to work on project
2. Work on engineering release review

Business

1. Project Work
 - a. Michael & Amani: worked on arduino and raspberry pi code
 - b. PH sensor not working now
2. Engineering Release Review-2/18 at 2:30 in EP 413
 - a. Kyle: worked on powerpoint, slides are assigned and on powerpoint
3. OnShape
 - a. Maggi: fixed 3D cover, will continue to work on it over the weekend to make sure everything is correct

Action items	Owner(s)	Deadline	Status
One Chamber Prototype Assembled	Maggi & Kyle	2/20	In Progress
Finish wiring one chamber prototype	Michael & Amani	2/20	
Engineering Release Review	Everyone	2/18	

2/25 Minutes

Location:	JML Shop
Date:	2/25/2020
Time:	2:30 PM-4:30 PM
Attendees:	Maggi Laan, Kyle Yates, Michael Nguy, Dev Shrestha

Agenda items

1. Chamber Build Updates
2. Sensor Updates

Business

1. Chamber Build Updates
 - a. Have hose barb adapters, immersion heaters, can mark and take to facilities
 - b. Budget Number: 806904
 - c. Acrylic Disk Measurements:
 - i. CO₂: 1" x $\frac{3}{4}$ "
 1. Account for wires on side
 - ii. O₂: 1.25 x 26/32"
 1. Account for wires on side
 - iii. CH₄: diameter 0.75"
 - iv. Water Level, 1 1/8" by 1/8"
 - v. Temperature $\frac{1}{4}$ "
 - vi. Pressure: diameter 1/8"
2. Sensor Updates
 - a. Still need circuit diagrams
 - b. Michael picking up Arduino from Amani
 - c. PCB takes 3-4 weeks to get here
 - i. Finish circuit diagram and then design PCB
3. Start dFMEA

Action items	Owner(s)	Deadline	Status
One Chamber Prototype Assembled	Maggi & Kyle	3/6	Need to take to facilities for final construction
Finish wiring one chamber prototype	Michael & Amani	3/6	
Snapshot	Everyone	3/6	
DFMEA	Everyone	3/6	
Circuit Diagram/PCB	Michael	3/13	

3/3 Minutes

Location: JML Shop
Date: 3/3/2020
Time: 2:30 PM-4:30 PM
Attendees: Maggi Laan, Kyle Yates, Michael Nguy, Dev Shrestha

Agenda items

1. Chamber Build Updates
2. Sensor Updates

Business

1. Chamber Build Updates
 - a. Have hose barb adapters, immersion heaters, can mark and take to facilities
 - b. Budget Number: 806904
 - c. Thermal Switch
 - d. Inoculation Port-self sealing
 - i. Probably less than 12 gauge
 - ii. 8-10 gauge needle at biggest
2. Sensor Updates
 - a. Making circuit diagrams on Eagle
3. Finish circuit/sensor FMEA

Action items	Owner(s)	Deadline	Status
One Chamber Prototype Assembled	Maggi & Kyle	3/6	Need to take to facilities for final construction
Finish wiring one chamber prototype	Michael & Amani	3/6	

Snapshot	Everyone	3/6
DFMEA	Everyone	3/6
Circuit Diagram/PCB	Michael	3/13

3/24 Minutes

Location: Zoom
Date: 3/24/2020
Time: 2:30 PM-3:00 PM
Attendees: Maggi Laan, Amani Al Fulaiti, Michael Nguy, Dev Shrestha

Agenda items

1. Semester Updates

Business

1. Semester Updates
 - a. Make 2-3 minute video
 - i. Each person can submit clip of talking about their section
 - b. Digital Poster
2. Electronics
 - a. PCB/Circuit Diagram drawing on OneDrive
3. Chambers
 - a. Retrofitting
 - i. Maggi-make drawing and send to Dev
 - b. Update 3D model for video
 - c. Laser cutting
 - i. Send dimensions to Chad/Dev with instructions
 - d. Facilities
 - i. Check to see hours/protocol for how they are operating
4. Finish circuit/sensor FMEA

Action items	Owner(s)	Deadline	Status
Retrofit model	Maggi	3/31	
Coding sensors	Michael & Amani	4/7	

Update 3D model	Maggi	4/7
Laser cutting	Maggi & Kyle	3/31

3/31 Minutes

Location:	Zoom
Date:	3/31/2020
Time:	2:30 PM-3:00 PM
Attendees:	Maggi Laan, Kyle Yates, Michael Nguy, Dev Shrestha

Agenda items

1. Updates on Stay at Home order
2. PCB Updates
3. Chamber Updates
4. Video Outline
5. Updated 3D Model
6. Poster Outline

Business

1. Updates on Stay at Home order
 - a. Can pick things up from JML if needed
 - b. Unsure about facilities availability
2. PCB Updates
 - a. No major problems now
 - b. Requires four power sources
 - i. Check on receiving access to GJ
 - ii. Check on powering with computer source
 - c. Target sampling frequency
 - i. Once a minute
3. Chamber Updates
 - a. Received inoculation ports and syringes
 - i. Only thing that needs to be done at facilities
 - b. Only need to make one chamber
 - c. Laser cut dimensions
 - i. Can send to chad or Dev
 - ii. Software link: <https://www.bosslaser.com/laser-software/>
4. Video Outline

- a. Add animation showing fluid/electrical wiring?
- 5. Updated 3D model
 - a. Correct link on drive
 - b. Look into adding animation/wiring
 - i. If needed, email Joel Perry for SolidWorks license, CC Dev
- 6. Poster Outline
 - a. Template not up yet
 - b. Pretty wordy right now, edit down

Action items	Owner(s)	Deadline	Status
PCB Finalization?	Michael		
Coding sensors	Michael & Amani		
Update 3D model	Maggi	4/7	
Laser cutting	Maggi & Kyle	4/7	

4/7 Minutes

Location: Zoom
Date: 4/7/2020
Time: 2:30 PM-3:00 PM
Attendees: Maggi Laan, Kyle Yates, Dev Shrestha

Agenda items

1. OnShape
2. Technical Presentation

Business

1. OnShape
 - a. Maggi struggling to get wiring done correctly
 - b. Kyle will export drawing to SolidWorks to finish pump drawing and do animation for technical presentation and video
2. Technical Presentation
 - a. We have the option of prerecording or doing a zoom session with judges
 - i. May be best to prerecord because of time difference with Amani

Action items	Owner(s)	Deadline	Status
PCB Finalization?	Michael		
Coding sensors	Michael & Amani		
Update 3D model	Maggi	4/7	
Laser cutting	Maggi & Kyle	4/7	

4/16 Minutes

Location:	Zoom
Date:	4/16/2020
Time:	2:30 PM-3:30 PM
Attendees:	Maggi Laan, Kyle Yates, Michael Nguy

Agenda items

1. Technical Presentation
2. Poster
3. Design Report

Business

1. Technical Presentation
 - a. Presenting on 5/1 at 12?
 - i. Can we still record our presentation so that Amani is able to join?
 - b. Record on Discord if possible
2. Poster
 - c. Due to lead instructor by 4/29
 - d. Michael will send circuitry information to Maggi for addition
 - i. Cannot edit on OneDrive
3. Design Report
 - a. Was due 4/7
 - b. Maggi will make outline today and turn in late
4. Kyle-send email to Amani for coordination on how to record technical presentation
5. We will do the video in separate parts
 - a. Need to write a script
 - b. Kyle-intro
 - c. Maggi-process flow
 - d. Michael-data acquisition
 - e. Amani-conclusion
6. Meet again on Saturday 4/18 to go over video script/presentation

Action items	Owner(s)	Deadline	Status
EXPO Poster	Maggi	4/29	
Video	Everyone	5/1	
Technical Presentation	Everyone	5/1	
Design Report	Everyone	5/8	
Fix 3D model, animate	Kyle	5/1	
Programming	Michael/Amani	5/1	

4/21 Minutes

Location: Zoom
Date: 4/21/2020
Time: 2:30 PM-3:00 PM
Attendees: Maggi Laan, Kyle Yates, Michael Nguy, Dev Shrestha

Agenda items

1. Technical Presentation

Business

1. Technical Presentation

Action items	Owner(s)	Deadline	Status
EXPO Poster	Maggi	4/29	
Video	Everyone	5/1	
Technical Presentation	Everyone	5/1	
Design Report	Everyone	5/8	
Fix 3D model, animate	Kyle	5/1	
Programming	Michael/Amani	5/1	