

# Semester Schedule

## Task Map

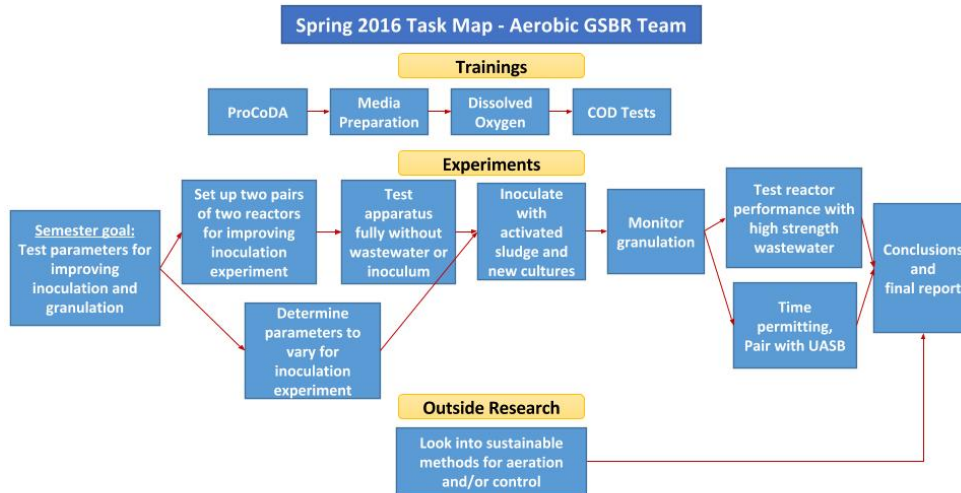


Figure 1: Task Map for Spring 2016

## Task List

You should keep and update your detailed task list from the first assignment in each of your reports. Denote completed tasks and modify your deadlines to reflect your most recently completed progress and any delays.

### 1. Group training

These tasks include training events intended to teach all team members essential laboratory methods that will be used throughout the semester. These training events may be conducted with other AguaClara wastewater teams.

- (a) ProCoDA (2/24/16) - Amiel
- (b) Dissolved oxygen measurement (2/29/16) - Amiel
- (c) Media preparation (3/2/16) - Nisarg
- (d) COD analysis (3/14/16) - Amiel
- (e) Nitrogen and phosphorous assays (*TBD if needed*)

### 2. Setup and start-up of four new GSBRT reactors

The first task for our semester will be to setup and begin operation on four new GSBRT reactors. The goal is to test the the improvement of the inoculation and granulation phase in GSBRTs through an experiment operating two sets of two new reactors. This set of tasks includes setting up the physical apparatus for the new reactors as well as programming a

new ProCoDA control program. This will also include a full test of the reactor system without wastewater or bacteria.

- (a) Create full process schematic for four reactors (2/19/16) - Amiel
- (b) Create list of necessary equipment and materials (2/19/16) - Victoria
- (c) Setup pumps and plumbing (02/22/16)- Victoria
- (d) Setup accumulator(s) for aeration (02/24/16) - Amiel
- (e) Program control with ProCoDA (02/26/16) - Amiel
- (f) Setup fridge and stock tanks (02/25/16) - Victoria
- (g) Run the reactor for a cycle with tap water (02/29/16) - Nisarg
- (h) Gas transfer test of aeration system (03/02/16) - Nisarg
- (i) Retrieve the bacteria to inoculate (03/11/16) - Amiel
- (j) Start the reactors (03/11/16) - Amiel
- (k) Monitor performance - All

**3. Determine parameters to vary for inoculation experiment**

The major goal for the semester will be to find new ways to improve the inoculation and granulation phase for GSBRS. To do this, one to two parameters will be varied between the two sets of reactors. Before conducting this experiment the parameters to be varied must be determined. At the start of the semester, the parameters considered include type of inoculum (sources for mixed-cultures), aeration rate, and type of substrates. These tasks will be conducted concurrently with the setup of the new reactors.

- (a) Review literature to for these three parameters influence on granulation (2/17/16) - All
- (b) Consult with Ruth and Cristina (2/17/16) - All
- (c) Make final decision (2/22/16) - Amiel

**4. Research new dissolved oxygen probes for lab**

The dissolved oxygen (DO) probes that are currently available to AguaClara require constant maintenance and provide fairly noisy results. For this reason, research will be conducted into finding new DO probes that are more reliable and more accurate.

- (a) Research online manufacturers for new DO probes (2/19/16) - Nisarg
- (b) Calculate and compare costs of 3-4 options (2/22/16) - Victoria
- (c) Review findings with Monroe and purchase (2/24/16) - Nisarg

**5. Test reactor performance with high strength wastewater**

AguaClara's research into GSBRS has thus far used wastewater with a COD of about 500 mg/L. One goal for this semester is to increase the strength of the wastewater used to ideally match that of blackwater. This will be done after operating the reactor with normal strength wastewater (COD of 500 mg/L) for at minimum several weeks. Test may include either several short spikes of high strength waste or may cover a longer time.

- (a) Pick high strength wastewater composition (4/22/16) - Victoria
- (b) Run experiment by feeding high strength wastewater to one set of two reactors (4/25/16) - All
- (c) Monitor results - All

#### 6. **Look into low-tech aeration and/or control methods**

One interest of the AguaClara GSBRR team is in the viability of GSBRRs as an application in Honduras. Sustainable and affordable aeration and control mechanisms would need to be used in order to operate a potential GSBRR with low-energy usage. Possibilities for further research will be explored over the semester along with recommendations for future experiments.

- (a) Conduct research on low-electricity methods for aerating the reactor (4/6/16) - Nisarg
- (b) Conceive low-tech options for control of reactor (4/20/16) - Amiel
- (c) Estimate net electricity consumption of the reactor (4/27/16) - Victoria

#### 7. **Research Reports**

The team member in charge of a research report is responsible for the final review and submission. All team members are expected to contribute equally to each report.

- (a) Research report due 2/26/16 - Nisarg
- (b) Research report due 3/11/16 - Amiel
- (c) Research report due 4/8/16 - Victoria
- (d) Research report due 4/22/16 - Nisarg
- (e) Final Report draft due 5/11/16 - Amiel
- (f) Final Report due 5/18/16 - All

#### 8. **Conclusions and analysis**

- (a) Review data on inoculation experiment as well as high strength wastewater test (5/1/16) - Amiel
- (b) Draw conclusions and suggest future work (5/9/16) - All