# CSCE 4925: Project Aero
# Project Plan

By: Alyssa Thurston, Breuna Riggins, James Sabetti, Travis Goral
Project Manager: Alyssa Thurston
Instructor: Professor Keathly
Client: Dan Minshew and Kyle Tayle, Denton Techmill
Date: 29 September 2017
Status: Final Draft

# Table of Contents

# Revisions

Below is a list of any revisions made to this document.

| Date | Description of Change Made | Person Making Change |
|---|---|---|
| 9/18/2017 | Draft Created | Breuna, Alyssa, James. Travis |
| 9/18/2017 | Draft Compiled | Breuna |
| 9/18/2017 | Document Edited | James |
| 9/18/2017 | Final Draft Complete | Breuna, Alyssa, James, Travis |
| 1/26/2018 | Final Draft Revisions- Added Spring Semester | Alyssa |
| 5/4/2018 | Final Draft Revisions | Alyssa |

# 1 Project Summary

The air quality in the City of Denton is notoriously bad. It's not a surprising fact given that there are two universities and multiple major highways and roadways that run through the city's limits. Worse still, there is only a single air quality sensor within city limits, and the next closest one is almost 15 miles away from the city.

The goal of this project is to create a network of air quality sensors to measure the air quality in the city of Denton so that citizens and city personnel alike can monitor air quality and take appropriate actions. The data obtained from the sensors is to be made public, so that air quality trends can be tracked all around the city. With these requirements met, the network would provide secure, real-time, and reliable data on the air quality in the city of Denton.

With the aim of creating a robust and open source of air quality data for the city of Denton, the Open Denton group has set out to establish a network of air quality sensors to gather and compile that data. In order to help achieve this goal, our group has been tasked with the following:

- Create a web client to display data in a highly readable manner.
- Create an API that records and displays air quality data in a readable manner
- Implement a scalable database to hold and model recorded data
- Integrate sensors and controllers that will read and relay data to the database over the internet
- Create documentation that allows community members to add sensors to the network

This document will establish tasks needed to be completed this semester, a schedule, and an overall plan.

# 1 General Information

This section includes some general information about the team and the project.

## 1.1 Points of Contact

Team Members

| Position | Name | Phone | E-Mail |
|---|---|---|---|
| Manager | Alyssa Thurston | (801)866-5851 | alyssathurston@my.unt.edu |
| Editor | James Sabetti | (972)757-6437 | jamessabetti@my.unt.edu |
| Compiler | Breuna Riggins | (214)298-7008 | breunariggins@my.unt.edu |
| Analyst | Travis Goral | (940)465-9422 | travisgoral@my.unt.edu |

Client Information

| Name | E-Mail |
|---|---|
| Kyle Taylor | kyletaylored@gmail.com |
| Dan Minshew | danminshew@gmail.com |

## 1.2 Project Charter

### 1.2.1 Problem

The city of Denton lacks robust and available air quality data. Denton is the most polluted city in the state of Texas and there is a strong need for a community-oriented air quality monitoring network.

### 1.2.2 Statement of Work

Document requirements for a full working system by October 26th, have a final design report for the project ready by the end of the semester, and build a working prototype system during the Spring 2018 semester.

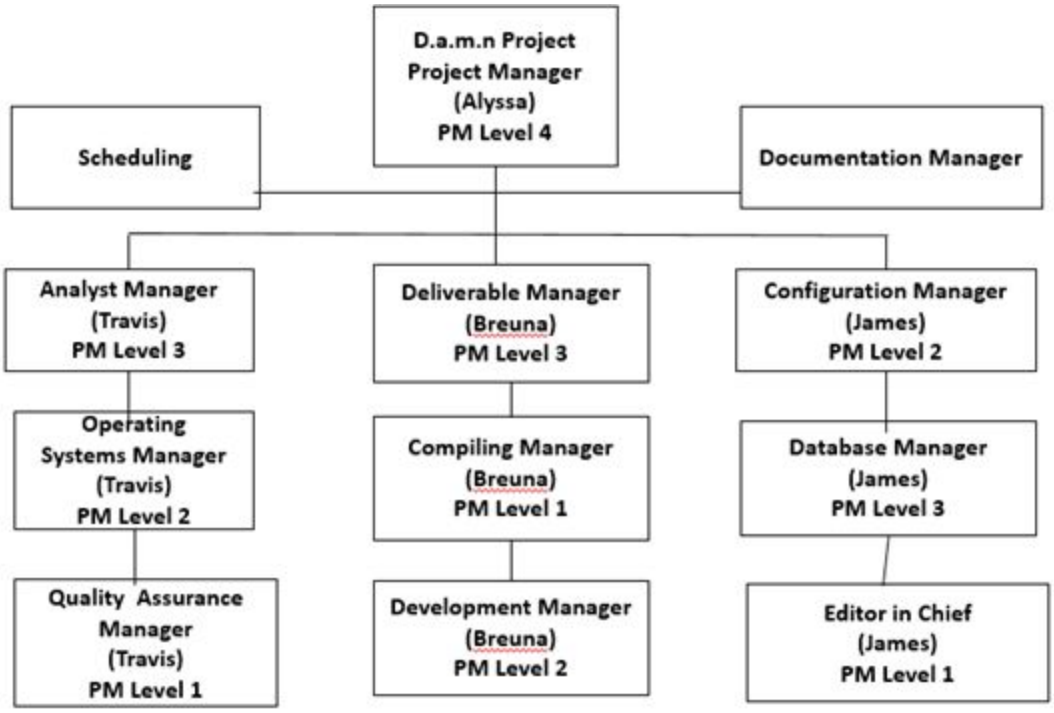
### 1.2.3 Objectives

Objectives may change over time as more project details are available. In general, our objectives are:

- Meet with the client regularly to discuss specific project details

- Produce a living status report and detailed plan
- Document requirements and specifications
- Test requirements with sensor controller
- Draw up design plan
- Submit final design report along with presentation
- Complete final documentation
- Prepare for delivery of the product
- Create a working prototype

## 1.3 Organization




## 1.4 Configuration Management

CCM Responsibility
Manager: J. Sabetti
Additional Staff for CM: To be recruited as needed.

Configuration Items: ensure that CM is implemented throughout the project’s life cycle.

| No. | Item | Comments |
|---|---|---|
| 1. | Database | |
| 2. | API | |
| 3. | Dashboard | |

# 2 Project Details

This section contains more specific information in regards to tasks that need to be completed for this project to come to fruition.

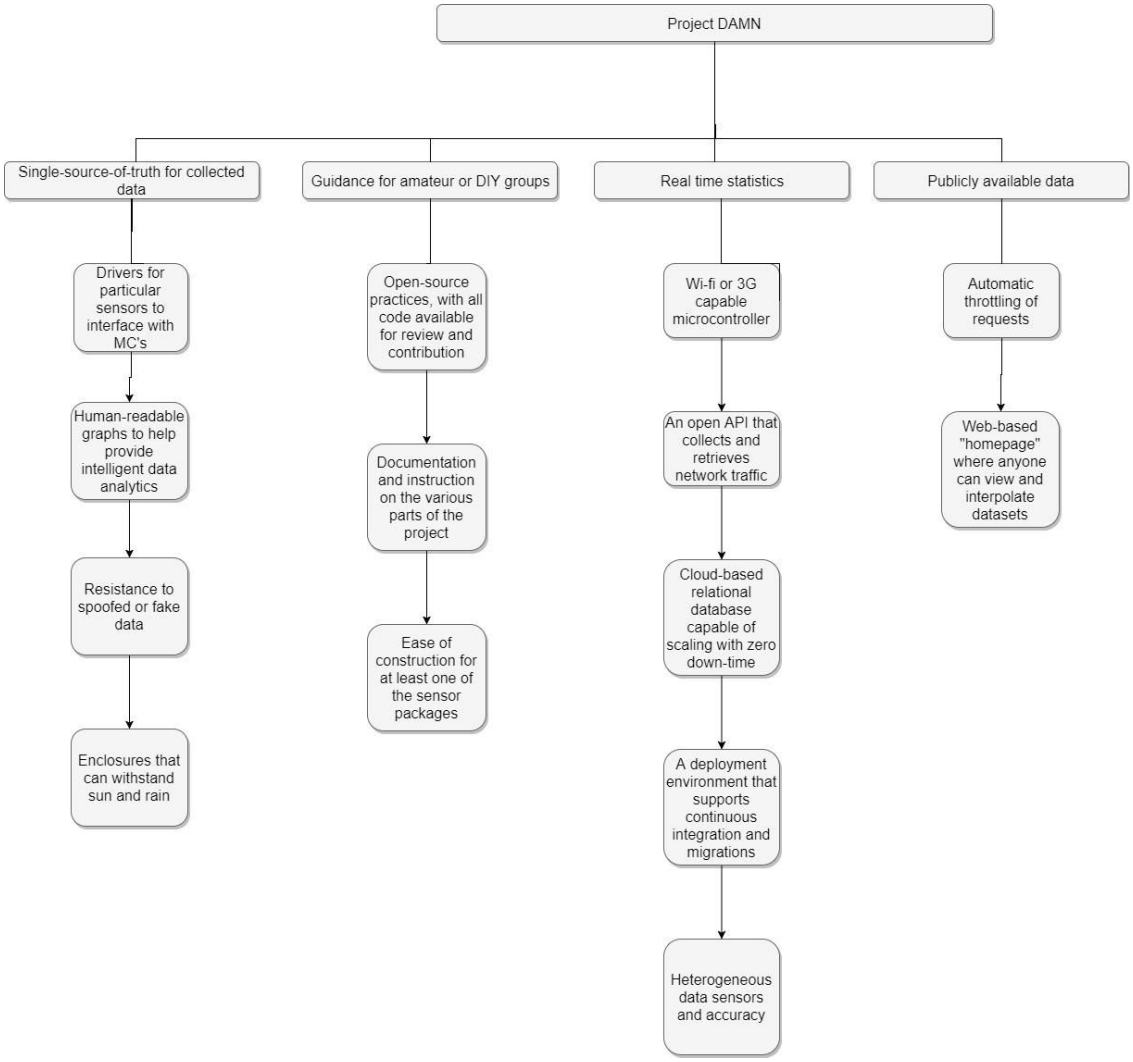
## 2.1 Activity List

The following is a list of activities pertinent to this project. Each draft and final form of a document has an internal due date of 24 hours before the final deadline, to accommodate any unforeseen obstacles related to the completion of this project.

| Activity Number | Activity Description | Internal Due Date | Due Date |
|---|---|---|---|
| 1.0 | Status Report (One) | Jan 18th | Jan 19 |
| 2.0 | Project Plan Revision | Jan 25th | Jan 26th |
| 2.1 | Detailed Design Revision | Jan 25th | Jan 26th |
| 3.0 | Status Report (Two) | Feb 1st | Feb 2nd |
| 4.0 | Deliverable Plan for Text Plan Draft | Feb 5th | Feb 5th |
| 4.1 | Deliverable Plan for Text Plan | Feb 8th | Feb 9th |
| 5.0 | Status Report (Three) | Feb 15th | Feb 16th |
| 5.1 | Test Plan and Procedure | Feb 15th | Feb 16th |
| 6.0 | Deliverable Report for Test Plan | Feb 18th | Feb 19th |
| 7.0 | Deliverable Plan for Maintenance Manual Draft | Feb 26th | Feb 26th |
| 7.1 | Deliverable Plan for Maintenance Manual | Mar 1st | Mar 2nd |
| 8.0 | Status Report (Four) | Mar 8th | Mar 9th |
| 9.0 | Deliverable Report for Maintenance Manual | Mar 11th | Mar 12th |
| 10.0 | Status Report (Five) | Mar 18th | Mar 19th |

| | | | |
|---|---|---|---|
| 11.0 | Midterm Peer Reviews | Mar 19th | Mar 20th |
| 12.0 | Test Readiness Review Presentations | Mar 21st | Mar 22nd |
| 12.0 | Deliverable Plan for Maintenance Manual Draft | Mar 19th | Mar 19th |
| 12.1 | Deliverable Plan for Users Manual | Mar 22nd | Mar 23nd |
| 13.0 | Status Report( six) | Mar 29th | Mar 30th |
| 13.1 | User Manual Draft | Mar 26th | Mar 26th |
| 13.2 | User Manual | Mar 29th | Mar 30th |
| 14.0 | Deliverable Report for Users Manual | Apr 1st | Apr 2 |
| 15.0 | Status Report 7 | Apr 12th | Apr 13th |
| 16.0 | Design Day Poster | Apr 22nd | Apr 23rd |
| 17.0 | Final presentation | Apr 26th | Apr 27th |
| 17.1 | Report Status (8) | Apr 26th | Apr 27th |
| 18.0 | Final Acceptance | Apr 30th | May 1st |
| 18.1 | Final Report | Apr 30th | May 1st |
| 19.0 | Final Peer Reviews | May 2nd | May 3rd |
| 19.1 | Final Project Notebook | May 2nd | May 3rd |
| 20.0 | Client Peer Review | May 9th | May 10th |
| 20.1 | Instructor Assessment | May 9th | May 10th |

## 2.2 WBS




## 2.3 Work Products

| Deliverable Name | Due Date | Date Delivered | Point of Contact |
|---|---|---|---|
| Deliverable Project Plan | Sept 20th | Sept 19th | Breuna Riggins |
| Status Report (One) | Sept 28th | | |
| Project Plan | Sept 29th | | |
| Deliverable Report for Project Plan | Oct 2nd | | |

| | | | |
|---|---|---|---|
| Deliverable Plan for Requirements | Oct 3rd | | |
| Status Report (Two) | Oct 12th | | |
| Requirements Spec | Oct 17th | | |
| Deliverable Report for Requirement Spec | Oct 18th | | |
| Deliverable Plan for Prelim Design | Oct 23rd | | |
| Status Report (Three) | Oct 26th | | |
| Prelim Design | Nov 3rd | | |
| Deliverable Report for Prelim Design | Nov 6th | | |
| Status Report (Four) | Nov 9th | | |
| Deliverable Plan for Detailed Design | Nov 13th | | |
| Status Report (Five) | Nov 30th | | |
| Detailed Design | Dec 1st | | |
| Deliverable Report for Detailed Design | Dec 4th | | |
| Status Report (Six) | Dec 7th | | |
| Status Report (One) | Jan 19 | | |
| Project Plan Revision | Jan 26th | | |
| Detailed Design Revision | Jan 26th | | |
| Status Report (Two) | Feb 2nd | | |
| Deliverable Plan for Test Plan | Feb 9th | | |
| Status Report (Three) | Feb 16th | | |
| Test Plan and Procedure | Feb 16th | | |

| | | | |
|---|---|---|---|
| Deliverable Report for Test Plan | Feb 19th | | |
| Deliverable Plan for Maintenance Manual | Mar 2nd | | |
| Status Report (Four) | Mar 9th | | |
| Deliverable Report for Maintenance Manual | Mar 12th | | |
| Status Report (Five) | Mar 19th | | |
| Midterm Peer Reviews | Mar 20th | | |
| Test Readiness Review Presentations | Mar 22nd | | |
| Deliverable Plan for Users Manual | Mar 23nd | | |
| Status Report( six) | Mar 30th | | |
| User Manual | Mar 30th | | |
| Deliverable Report for Users Manual | Apr 2 | | |
| Status Report 7 | Apr 13th | | |
| Design Day Poster | Apr 23rd | | |
| Final presentation | Apr 27th | | |
| Report Status (8) | Apr 27th | | |
| Final Acceptance | May 1st | | |
| Final Report | May 1st | | |
| Final Peer Reviews | May 3rd | | |
| Final Project Notebook | May 3rd | | |
| Client Peer Review | May 10th | | |
| Instructor Assessment | May 10th | | |

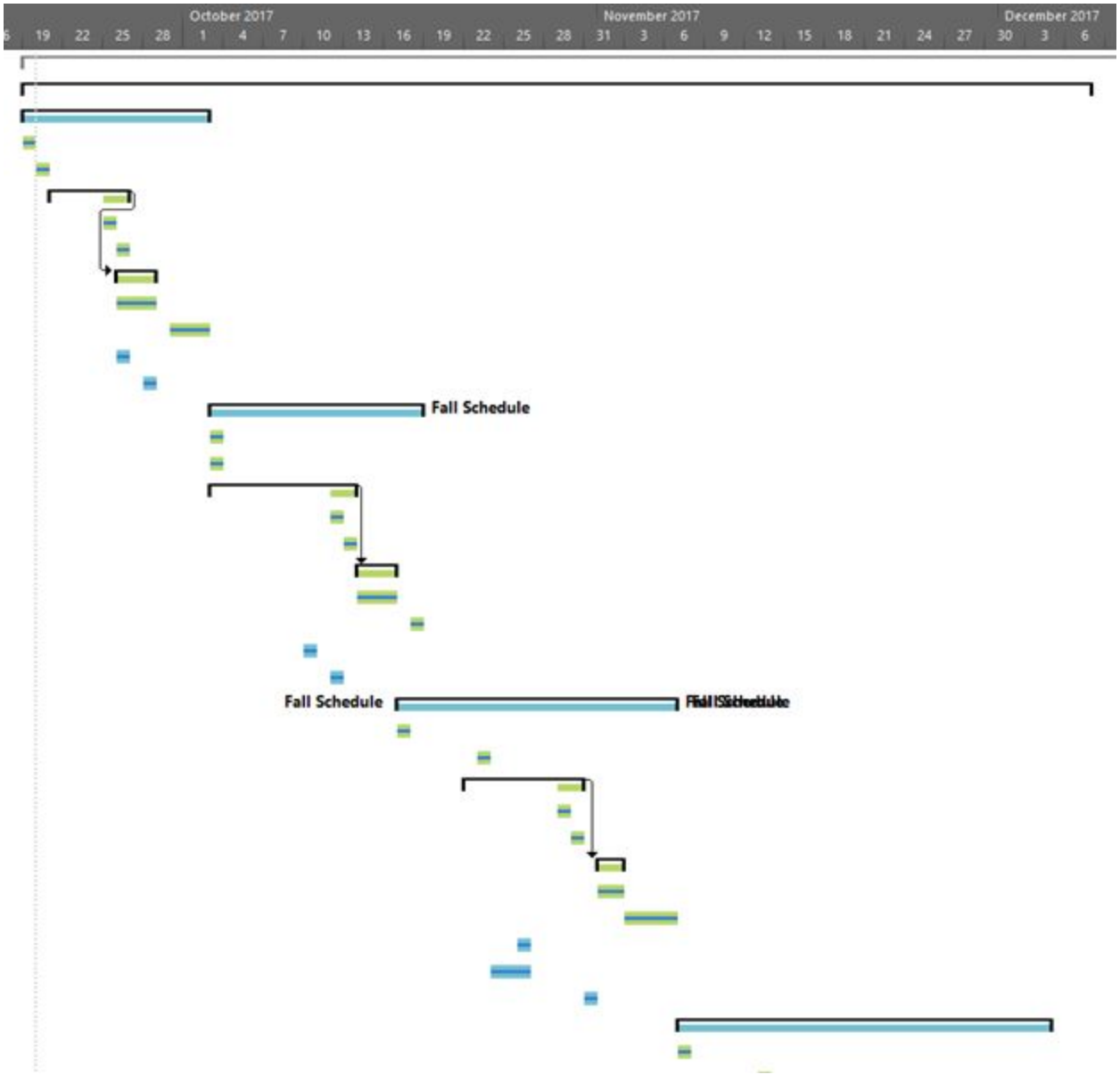
## 2.4 Schedule

For each assignment, those that are turned in to either the client or the professor, the assignment is due (internally) 48 hours before the draft is due. This will allow 24 hours to compile the document together, and 24 hours to edit the document and turn it in by the due date. On this note, the Gantt Chart is provided below.

| ID | Task Mode | Task Name | Duration | Start | Finish |
|---|---|---|---|---|---|
| 0 | | **Project Plan** | **164 days** | **Tue 9/19/17** | **Thu 5/3/18** |
| 1 | | **Fall Schedule** | **59 days** | **Tue 9/19/17** | **Thu 12/7/17** |
| 2 | | **Project Plan** | **11 days** | **Tue 9/19/17** | **Mon 10/2/17** |
| 3 | | Project Plan Lecture | 1 day | Tue 9/19/17 | Tue 9/19/17 |
| 4 | | Project Plan Plan | 1 day | Wed 9/20/17 | Wed 9/20/17 |
| 5 | | **Project Plan Draft** | **5 days** | **Thu 9/21/17** | **Tue 9/26/17** |
| 6 | | Document Compilation | 1 day | Mon 9/25/17 | Mon 9/25/17 |
| 7 | | Document Editing | 1 day | Tue 9/26/17 | Tue 9/26/17 |
| 8 | | **Project Plan- Final** | **3 days** | **Tue 9/26/17** | **Thu 9/28/17** |
| 9 | | Necessary Revisions | 3 days | Tue 9/26/17 | Thu 9/28/17 |
| 10 | | Project Plan Report | 2 days | Sat 9/30/17 | Mon 10/2/17 |
| 11 | | Team Meeting (During Class) | 1 day | Tue 9/26/17 | Tue 9/26/17 |
| 12 | | Status Report 1 | 1 day | Thu 9/28/17 | Thu 9/28/17 |
| 13 | | **Requirements Specifications** | **12 days** | **Tue 10/3/17** | **Wed 10/18/17** |
| 14 | | Requirements Lecture | 1 day | Tue 10/3/17 | Tue 10/3/17 |
| 15 | | Requirements Specifications Plan | 1 day | Tue 10/3/17 | Tue 10/3/17 |
| 16 | | **Requirements Specifications Draft** | **9 days** | **Tue 10/3/17** | **Fri 10/13/17** |
| 17 | | Document Compilation | 1 day | Thu 10/12/17 | Thu 10/12/17 |
| 18 | | Document Editing | 1 day | Fri 10/13/17 | Fri 10/13/17 |
| 19 | | **Requirements Specifications- Final** | **2 days** | **Sat 10/14/17** | **Mon 10/16/17** |
| 20 | | Necessary Revisisions | 2 days | Sat 10/14/17 | Mon 10/16/17 |
| 21 | | Requirements Specifications Report | 1 day | Wed 10/18/17 | Wed 10/18/17 |
| 22 | | Team Meeting (During Class) | 1 day | Tue 10/10/17 | Tue 10/10/17 |
| 23 | | Status Report 2 | 1 day | Thu 10/12/17 | Thu 10/12/17 |
| 24 | | **Preliminary Design** | **15 days** | **Tue 10/17/17** | **Mon 11/6/17** |
| 25 | | Preliminary Design Lecture | 1 day | Tue 10/17/17 | Tue 10/17/17 |
| 26 | | Preliminary Design Plan | 1 day | Mon 10/23/17 | Mon 10/23/17 |
| 27 | | **Preliminary Design Draft** | **7 days** | **Sun 10/22/17** | **Mon 10/30/17** |
| 28 | | Document Compilation | 1 day | Sun 10/29/17 | Sun 10/29/17 |
| 29 | | Document Editing | 1 day | Mon 10/30/17 | Mon 10/30/17 |
| 30 | | **Preliminary Design- Final** | **2 days** | **Wed 11/1/17** | **Thu 11/2/17** |

| | | | | | | |
|---|---|---|---|---|---|---|
| 31 | ✓ | | Necessary Revisions | 2 days | Wed 11/1/17 | Thu 11/2/17 |
| 32 | ✓ | | Preliminary Design Report | 2 days | Fri 11/3/17 | Mon 11/6/17 |
| 33 | ✓ | | Status Report 3 | 1 day | Thu 10/26/17 | Thu 10/26/17 |
| 34 | ✓ | | Requirements Review | 3 days | Tue 10/24/17 | Thu 10/26/17 |
| 35 | ✓ | | Team Meeting (During Class) | 1 day | Tue 10/31/17 | Tue 10/31/17 |
| 36 | ✓ | | **Detailed Design** | **20 days** | **Tue 11/7/17** | **Mon 12/4/17** |
| 37 | ✓ | | Detailed Design Lecture | 1 day | Tue 11/7/17 | Tue 11/7/17 |
| 38 | ✓ | | Detatiled Design Plan | 1 day | Mon 11/13/17 | Mon 11/13/17 |
| 39 | ✓ | | **Detailed Design Draft** | **10 days** | **Tue 11/14/17** | **Mon 11/27/17** |
| 40 | ✓ | | Document Compilation | 1 day | Sun 11/26/17 | Sun 11/26/17 |
| 41 | ✓ | | Document Editing | 1 day | Mon 11/27/17 | Mon 11/27/17 |
| 42 | ✓ | | **Detailed Design- Final** | **2 days** | **Wed 11/29/17** | **Thu 11/30/17** |
| 43 | ✓ | | Necessary Revisions | 2 days | Wed 11/29/17 | Thu 11/30/17 |
| 44 | ✓ | | Detailed Design Report | 2 days | Fri 12/1/17 | Mon 12/4/17 |
| 45 | ✓ | | Status Report 4 | 1 day | Thu 11/9/17 | Thu 11/9/17 |
| 46 | ✓ | | Team Meeting (During Class) | 1 day | Tue 11/14/17 | Tue 11/14/17 |
| 47 | ✓ | | Wrapup Lecture | 1 day | Tue 11/28/17 | Tue 11/28/17 |
| 48 | ✓ | | Status Report 5 | 1 day | Thu 11/30/17 | Thu 11/30/17 |
| 49 | ✓ | | Design Review | 3 days | Tue 12/5/17 | Thu 12/7/17 |
| 50 | ✓ | | Status Report 6 | 1 day | Thu 12/7/17 | Thu 12/7/17 |
| 51 | | | **Spring Schedule** | **78 days** | **Tue 1/16/18** | **Thu 5/3/18** |
| 52 | | | Project Plan Updates | 9 days | Tue 1/16/18 | Fri 1/26/18 |
| 53 | | | Detailed Design Updates | 9 days | Tue 1/16/18 | Fri 1/26/18 |
| 54 | | | Status Report 1 | 1 day | Fri 1/19/18 | Fri 1/19/18 |
| 55 | | | Status Report 2 | 1 day | Fri 2/2/18 | Fri 2/2/18 |
| 56 | | | **Test Plan and Procedure** | **20 days** | **Tue 1/23/18** | **Mon 2/19/18** |
| 57 | | | Lecture | 3 days | Tue 1/23/18 | Thu 1/25/18 |
| 58 | | | Test Plan and Procedure Plan | 1 day | Tue 1/30/18 | Tue 1/30/18 |
| 59 | | | **Test Plan and Procedure Plan Draft** | **12 days** | **Tue 1/30/18** | **Wed 2/14/18** |

| ID | Task Mode | Task Name | Duration | Start | Finish |
|---|---|---|---|---|---|
| 60 | | Document Compilation | 1 day | Tue 2/13/18 | Tue 2/13/18 |
| 61 | | Document Editing | 1 day | Wed 2/14/18 | Wed 2/14/18 |
| 62 | | **Test Plan and Procedure Final Draft** | **3 days** | **Wed 2/14/18** | **Fri 2/16/18** |
| 63 | | Necessary Revisions | 3 days | Wed 2/14/18 | Fri 2/16/18 |
| 64 | | Test Plan and Procedure Report | 1 day | Mon 2/19/18 | Mon 2/19/18 |
| 65 | | **Maintenance Manual** | **35 days** | **Tue 2/13/18** | **Mon 4/2/18** |
| 66 | | Lecture | 1 day | Tue 2/13/18 | Tue 2/13/18 |
| 67 | | Maintenance Manual Plan | 1 day | Thu 2/15/18 | Thu 2/15/18 |
| 68 | | **Maintenance Manual Draft** | **15 days** | **Thu 2/15/18** | **Wed 3/7/18** |
| 69 | | Document Compilation | 3 days | Sat 3/3/18 | Tue 3/6/18 |
| 70 | | Document Editing | 1 day | Wed 3/7/18 | Wed 3/7/18 |
| 71 | | **Maintenance Manual Final Draft** | **3 days** | **Wed 3/7/18** | **Fri 3/9/18** |
| 72 | | Necessary Revisions | 3 days | Wed 3/7/18 | Fri 3/9/18 |
| 73 | | Maintenance Manual Report | 1 day | Mon 3/12/18 | Mon 3/12/18 |
| 74 | | **User Manual** | **33 days** | **Thu 2/15/18** | **Mon 4/2/18** |
| 75 | | Lecture | 1 day | Thu 2/15/18 | Thu 2/15/18 |
| 76 | | User Manual Plan | 1 day | Fri 2/16/18 | Fri 2/16/18 |
| 77 | | **User Manual Draft** | **29 days** | **Sat 2/17/18** | **Wed 3/28/18** |
| 78 | | Document Compilation | 3 days | Sat 3/24/18 | Tue 3/27/18 |
| 79 | | Document Editing | 1 day | Wed 3/28/18 | Wed 3/28/18 |
| 80 | | **User Manual Final Draft** | **3 days** | **Wed 3/28/18** | **Fri 3/30/18** |
| 81 | | Necessary Revisions | 3 days | Wed 3/28/18 | Fri 3/30/18 |
| 82 | | User Manual Report | 1 day | Mon 4/2/18 | Mon 4/2/18 |
| 83 | | Status Report 3 | 1 day | Fri 2/16/18 | Fri 2/16/18 |
| 84 | | Application Prototype | 24 days | Tue 1/30/18 | Fri 3/2/18 |
| 85 | | Status Report 4 | 1 day | Fri 3/2/18 | Fri 3/2/18 |
| 86 | | Status Report 5 | 1 day | Mon 3/19/18 | Mon 3/19/18 |
| 87 | | Test Readiness Presentation | 1 day | Thu 3/22/18 | Thu 3/22/18 |
| 88 | | Status Report 6 | 1 day | Fri 3/30/18 | Fri 3/30/18 |
| 89 | | Status Report 7 | 1 day | Fri 4/13/18 | Fri 4/13/18 |
| 90 | | Application Revisions | 31 days | Sat 3/3/18 | Fri 4/13/18 |
| 91 | | Design Day Poster | 15 days | Tue 4/3/18 | Mon 4/23/18 |
| 92 | | Design Day | 1 day | Fri 4/27/18 | Fri 4/27/18 |
| 93 | | Status Report 8 | 1 day | Fri 4/27/18 | Fri 4/27/18 |
| 94 | | Final Acceptance Test Procedure and Results | 1 day | Tue 5/1/18 | Tue 5/1/18 |
| 95 | | Final Report | 1 day | Tue 5/1/18 | Tue 5/1/18 |
| 96 | | Final Project Notebooks | 1 day | Thu 5/3/18 | Thu 5/3/18 |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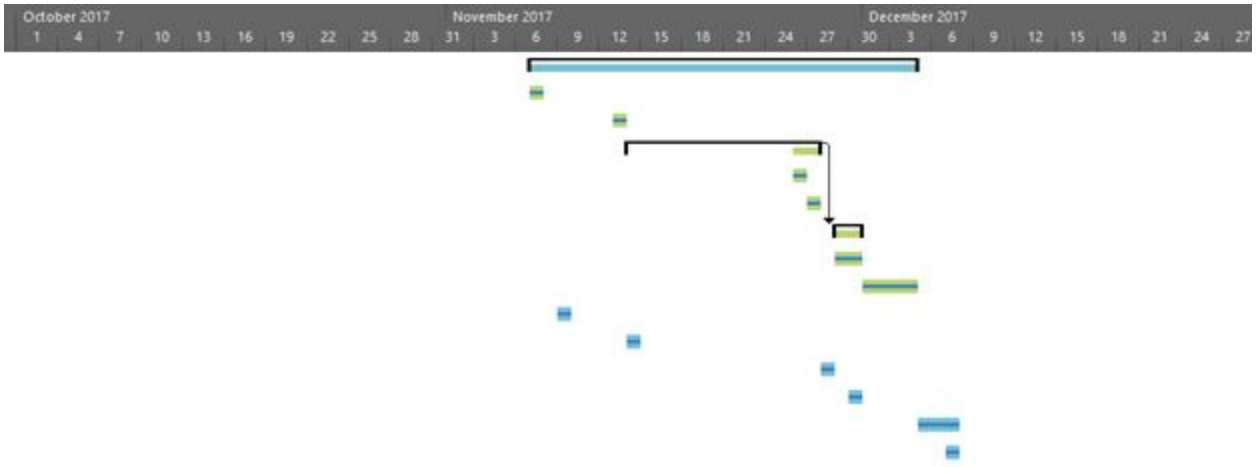
November 2017
December 2017
19 22 25 28 1 4 7 10 13 16 19 22 25 28 31 3 6 9 12 15 18 21 24 27 30 3 6
Fall Schedule
Fall Schedule




## 2.5 Risks

With a project of this size, there is going to be some level of risk. Risks are listed below by level of severity along with possible ways to mitigate those risks.

### 2.5.1 High

- Scope creep – The project scope may grow immensely, forcing the group to push back deadlines. In some cases, deadlines may have to be moved to earlier dates to allow a certain amount of time slack.
- Learning curve – Group members will need to quickly familiarize themselves with client frameworks and current databases. Significant time will need to be spent learning how to interact with their existing sensors and databases.

### 2.5.2 Medium

- Other classwork – Homework and projects from other classes may eat into time to work on Capstone. Not much can be done about this risk except to make sure that individual group members do their work and communicate with the group.
- Lack of Skills – Group members may not possess sufficient skills in coding, documentation or other areas needed to complete the project. Although this is not a huge risk for the first semester, it can become a big risk by the Spring if group members do not take the time to learn and hone their skills

### 2.5.3 Low

- Group member availability – A group member may be busy with other things or unable to meet or turn in work. Other group members should be able to pick up the slack. Google Hangouts and Drive will be used as an alternative to personal meetings as needed.

## 2.6 Issues and Action Items

For now, because the project is just starting out, there aren't many issues. There are a few action items that are being worked on. Should any issues arise down the road, this document will be updated to include the following items: Description of the issue, when the issue was identified, when the issue was resolved, and who is responsible for the resolution.

Listed below are the top five action items as the project currently stands.

| Action Item Number | Action Item Description | Assigned Person(s) | Open Date | Closed Date | Status |
|---|---|---|---|---|---|
| 1 | Research database servers | All | 9/26 | | In progress |
| 2 | Research and discuss possible API solutions | All | TBD | | In progress |
| 3 | Research EPA requirements for what constitutes as clean air and dirty air | All | 9/26 | | In progress |
| 4 | Learn how to best utilize Slack (our means of communication with our sponsors) | All | 9/26 | | In progress |
| 5 | Research dashboard options | All | TBD | | In progress |