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| **ENGI 1331: Project 1 General Description** | **1** |



**National Academy of Engineers Grand Challenges:**

In this project you will investigate an engineering challenge. The National Academy of Engineers has listed 14 Grand Challenges facing our world that need to be understood and solved. These challenges are listed and described at http://www.engineeringchallenges.org/challenges.aspx. The first step in solving one of these problems is understanding and being able to identify the problem.



**Project Overview:**

In this project you will work in teams on a common topic then effectively communicate the logic, results, and improvements made to investigate your challenge. You will investigate one of the grand challenges using the data acquired by you and your team. Your goal is to learn and produce information about your topic from data sets using MATLAB as a tool with a usable interface. Someone who knows nothing about the Grand Challenge you choose should be able to use your program and gain information they would not have know otherwise.

**Project Deliverables & DUE Dates**



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| **Deliverable** | **Percent** | **DUE Date** |
| **Project 1A:**Summary and Goal with Data Set(s) | 5% | Wednesday, September 20th, 2017 @ 11 PM |
| **Project 1B:**Updated goals and data sets with Proposed Algorithm  | 10% | Wednesday, September 27th, 2017 @ 11 PM |
| **Project 1C:**Updated Algorithm and Data validation code | 15% | Wednesday, October 18th, 2017 @ 11 PM |
| **Project 1D:**Final Code | 30% | Wednesday, November 1st, 2017 @ 11 PM |
| **Project 1E:**Poster and Video Submission | 20% | Wednesday, November 8th, 2017 @ 11 PM |
| **Project 1F:**Discussion Board and group evaluation | 20% | Friday, November 10th, 2017 @ 11 PM |



**Group and Individual Roles:**

Groups will be made up of 4-5 students. All submissions are group submission except for Project 1F. A group evaluation will be completed at the end of the project and used as a multiplier on the group grades for the project. Your group evaluation grade will be determined from peer reviews based on your contribution on the topic selection, code development and review process.

*A detailed rubric will be provided with each deadline to let you know how your project will be graded and what should be included.*

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| **ENGI 1331: Project 1 General Description** | **2** |



**Project 1A: Summary and Goal with Data Set(s) (5%)**

Group Submission

**Summary and Goal:**

As a group, you will submit a one-paragraph summary of the challenge you have chosen. Your summary should include the following points:

* What are the challenges of the topic chosen?
* What do we need to know more about this challenge?
* What role do engineers have in solving this challenge?

You need to define the goal of the program you will be building by addressing some of the following questions:

* What is the purpose of your program?
* What information will the user gain or be able to use?

**Data Set:**

Briefly describe the data you are using and include the reference (source) of your data. Include URL or publication citations. Your response should answer the following questions:

* How does this data relate to the NAE Grand Challenge you chose?
* Where did you obtain this data from? What agency or source?
* Is this data specific to a certain region or place?
* What do you hypothesize to find from your acquired data set?

**DELIVERABLES FOR 1A** (submit as a .zip folder that contains)

* Summary and Data Set description from template (.pdf)
* Data Set(s) (.xlsx or .csv).

**Project 1B: Updated Purpose and Data set with Proposed Algorithm (10%)**

Group Submission

***Updated Purpose and Data Set***

Using the template provided for Project 1B, submit any changes with justification that you have made from the 1A submission. All comments provided from 1A should be addressed and new or additional data should be included if necessary.

***Proposed Algorithm***

Based on your updated purpose and data set, create a general algorithm/process you believe will achieve this purpose with the information you have. The algorithm should include user inputs or menus that will allow the user to interact with the program. Since some topics have not been covered, it is acceptable to have general steps about plotting, regression, or other items that you may not be able to code at this point. We will get there and this will be a great chance to get feedback on whether it is plausible or not!

**DELIVERABLES FOR 1B** (submit as a .zip folder that contains)

* Copy of previous 1A submission
* Template with updates to purpose and data set (.pdf)
* All data sets being used (new and previously submitted if necessary)
* Algorithm sheet with a flow (process) using graphical or outline (.pdf)

**Project 1C: Updated Algorithm and Data Validation Code (15%)**

Group Submission

Based on the comments from the 1B submission and the new skills learned in class, you will submit an updated algorithm with additional details.

You will also submit the beginning of your code that must include at a minimum the data checks and validation for your data set and/or any user inputs. Additional code can be turned in for feedback. The more code you have now, the more feedback you will receive!

**DELIVERABLES FOR 1C** (submit as a .zip folder that contains)

* Copy of algorithm submission from 1B (.pdf)
* Updated algorithm with justification for changes. (.pdf)
* All data sets being used
* Matlab Script that includes the beginnings of your code and data validations and checks (.m)

**Project 1D: Final Code and Algorithm Submission (30%)**

Group Submission

Based on feedback from the previous submission, your group will submit a code that works without errors and achieve the overall goal and purpose defined by your group in previous documents and the algorithm.

**DELIVERABLES FOR 1D** (submit as a .zip folder that contains)

* *Algorithm and test cases (PDF),*
* *Group code (.m) and additional function files (if used),*
* *Data set used with the code (.xlsx or .csv)*.

**Project 1E: Poster and Video Submission (20%)**

Group Submission

***Tutorial Video (10%)***

A video of the code should walk through the entire development and final code. You should run the code with different scenarios to show the capability and functionality of your code. Each group member must have a part in the video. It will be uploaded to youtube and you will provide the link with a short summary. You will submit a pdf document that contains the link to your 10 minute video and short summary of your video.  Make sure the uploaded document includes your names and the title of the video.

***Academic Poster (10%)***

Sample posters are provided for your reference. Your poster must be 42” (width) x 36” (height) and you should explain the background equations, derivation, algorithm, results, and future steps. Templates can be found through open sources as .ppt files (PowerPoint) but make sure to check the size using page setup! Your final poster submission should be saved as a .pdf file.

**DELIVERABLES FOR 1E** (submit as a .zip folder that contains)

* *Tutorial Video (.pdf with video link)*
* *Poster (.pdf)*

**Project 1F: Discussion Board and Group Evaluation (20%)**

Individual Submission

***Discussion Board Posts (10%)***

As part of your individual project component you are required to comment on and evaluate the work done by other students. You must provide commentary on the projects of TWO other groups, and at least one of these groups must have a different topic than your group. Comments on other groups’ work should include:

* Clearly note at least one specific aspect of their code or approach which you thought was strong or interesting
* Relate this to what you did in your project OR talk about something you learned about their topic
* Comments should be written in a professional tone and address group members

***Group Evaluation (10%)***

You will be provided a Google link to complete the group evaluation form at the end of the project. Your grade for the group evaluation portion of the project will be based on the evaluations completed by your peers AND the thoughtfulness of your responses to the questions in the survey.  Points will be deducted from this portion of your project grade if it is clear that no thought was given in the free response questions.  This does not mean your responses should be long.  It just means don't write "response" or "hello" in every box.  Your responses should have meaning.