- In this capstone, we will predict if the Falcon 9 first stage will land successfully

- In this module, you will be provided with an overview of the problem and the tools you need to complete the course

**Course Introduction**

- Hello! And welcome to this capstone course

- Congratulations for making it this far!

- My name is Joseph Santarcangelo, Yan Luo and Azim Hirjani . We are pleased to be your instructors and course developers for this capstone course

- You will apply your data science skills as a Data scientist for a private space launch company in this project

- As a starting point of almost all data science projects, you need to collect data, as much and relevant as possible

- You will be collecting data from various sources. After your raw data has been collected, you will need to improve the quality by performing data wrangling

- Then you can start exploring the processed data. We will be your guide as we explore some really interesting real-world datasets together. You'll get to practice your SQL skills as we query the data and gather insights

- You'll gain further insights into the data by applying some basic statistical analysis and data visualization, you'll be able to see directly how variables might be related to each other

- We'll drill down into finer levels of detail by splitting the data into groups defined by categorical variables or factors in your data

- You will be guided to build, evaluate, and refine predictive models for discovering more exciting insights

- The final task of this capstone project is to create a presentation that will be developed into stories of all your analysis

- Thanks and good luck!

**Module 1**

**Project Scenario and Overview**

- The commercial space age is here; companies are making space travel affordable for everyone.

- Virgin Galactic is providing suborbital spaceflights.

- Rocket Lab is a small satellite provider.

- Blue Origin manufactures sub-orbital and orbital reusable rockets.

- Perhaps the most successful is SpaceX.

- SpaceX’s accomplishments include:

Sending spacecraft to the International Space Station.

Starlink, a satellite internet constellation providing satellite Internet access

Sending manned missions to Space.

- One reason SpaceX can do this is the rocket launches are relatively inexpensive. SpaceX advertises Falcon 9 rocket launches on its website with a cost of 62 million dollars; other providers cost upwards of 165 million dollars each, much of the savings is because SpaceX can reuse the first stage.

- Therefore, if we can determine if the first stage will land, we can determine the cost of a launch.

- Spaces X’s Falcon 9 launch like regular rockets.

- To help us understand the scale of the Falcon 9, we are going to use these diagrams from Forest Katsch, at  zlsadesign.com.

- He is a 3D artist and software engineer. He makes infographics on spaceflight and spacecraft art. He also makes software.

- The payload is enclosed in the fairings. Stage two, or the second stage, helps bring the payload to orbit, but most of the work is done by the first stage.

- The first stage is shown here. This stage does most of the work and is much larger than the second stage.

- Here we see the first stage next to a person and several other landmarks. This stage is quite large and expensive.

- Unlike other rocket providers, SpaceX's Falcon 9 Can recover the first stage.

- Sometimes the first stage does not land. Sometimes it will crash as shown in this clip. Other times, Space X will sacrifice the first stage due to the mission parameters like payload, orbit, and customer.

- In this capstone, you will take the role of a data scientist working for a new rocket company. Space Y that would like to compete with SpaceX founded by Billionaire industrialist Allon Musk.

- Your job is to determine the price of each launch. You will do this by gathering information about Space X and creating dashboards for your team.

- You will also determine if SpaceX will reuse the first stage. Instead of using rocket science to determine if the first stage will land successfully, you will train a machine learning model and use public information to predict if SpaceX will reuse the first stage.

**Getting started with GitHub**

- In this lab, you will get started with GitHub by creating a GitHub account and project and adding a file to it using its Web interface

- GitHub in simple words is a collection of folders and files.

- It is a Git repository hosting service, but it adds many of its own features.

- While Git is a command-line tool and a server needs to be hosted and maintained via command line as well, GitHub provides this Git server for you and a Web-based graphical interface.

- It also provides access control and several collaboration features, such as wikis and basic task management tools for every project.

- GitHub provides cloud storage for source code, supports all popular programming languages, and streamlines the iteration process.

- GitHub includes a free plan for individual developers and for hosting open source projects