

Learning Plan Examples

Analytical Methods for Global Policy Studies (PA397G)

<https://amgps.jima.me/>

EXAMPLE 1

Focus: Fundamentals, Data Cleaning, and Statistical Thinking in Python	
RESOURCES/MATERIALS DataCamp courses	
LEARNING PLAN OBJECTIVE My main objective is to learn the fundamentals of Python through DataCamp, as I will use Python for the replication project. I will also learn about data cleaning and statistical thinking in Python.	
LEARNING PLAN TIMELINE AND ACTION STEPS	
<i>Week 1: Sept 19 - Sept 25</i>	
DataCamp Course Work Introduction to Python (4 hrs) <ul style="list-style-type: none"> • Python Basics • Python Lists • Functions and Packages • NumPy 	Documenting Progress/Assessing Performance <ul style="list-style-type: none"> • I will use a running Google Doc to type up my Python notes, which I will use for reference and to demonstrate progress • Upload screenshots of 4 completed exercises from Data Camp to Google Drive Folder
<i>Week 2: Sept 26 - Oct 2</i>	
DataCamp Course Work Intermediate Python (4 hrs) <ul style="list-style-type: none"> • Matplotlib • Dictionaries & Pandas • Logic, Control Flow, and Filtering • Loops 	Documenting Progress/Assessing Performance <ul style="list-style-type: none"> • Update Google Doc with week's notes • Upload screenshots of 4 completed exercises from Data Camp to Google Drive Folder
<i>Week 3: Oct 3 - Oct 9</i>	
DataCamp Course Work Python Data Science Tool Box - Part 1 (3 hrs) <ul style="list-style-type: none"> • Writing your own functions • Default arguments, variable-length arguments and scope • Lambda functions and error-handling Intermediate Python (OPTIONAL- if time permits) <ul style="list-style-type: none"> • Case Study: Hacker Statistics 	Documenting Progress/Assessing Performance <ul style="list-style-type: none"> • Update Google Doc with week's notes • Upload screenshots of 3 completed exercises from Data Camp to Google Drive Folder • The case study looks very helpful for practicing skills I have learned thus far. I am including this task as "optional" because I should still be able to successfully complete the final skills assessment on DataCamp without it.
<i>Week 4: Oct 10 - Oct 16</i>	
DataCamp Course Work Python Data Science Tool Box - Part 2 (4 hrs) <ul style="list-style-type: none"> • Using iterators in PythonLand • List comprehensions and generators 	Documenting Progress/Assessing Performance <ul style="list-style-type: none"> • Update Google Doc with week's notes • Upload screenshots of 2 completed exercises from Data Camp to Google Drive Folder

<i>Week 5: Oct 17 - Oct 23</i>	
DataCamp Course Work Python Fundamentals Final Skills Assessment Introduction to Importing Data in Python (3 hrs) <ul style="list-style-type: none"> ● Introduction and flat files ● Importing data from other file types ● Working with relational databases in Python 	Documenting Progress/Assessing Performance <ul style="list-style-type: none"> ● Complete Final Skills Assessment and upload screenshot to Google Drive Folder ● Update Google Doc with week's notes ● Upload screenshots of 3 completed exercises from Data Camp to Google Drive Folder
<i>Week 6: Oct 24 - Oct 30</i>	
DataCamp Course Work Cleaning Data in Python (4 hrs) <ul style="list-style-type: none"> ● Common data problems ● Text and categorical data problems ● Advanced data problems ● Record linkage 	Documenting Progress/Assessing Performance <ul style="list-style-type: none"> ● Update Google Doc with week's notes ● Upload screenshots of 4 completed exercises from Data Camp to Google Drive Folder
<i>Week 7: Oct 31 - Nov 6</i>	
DataCamp Course Work Documenting Statistical Thinking in Python Part 1 (3 hrs) ● <ul style="list-style-type: none"> ● Graphical Exploratory Data Analysis ● completed exercises from Data ● Quantitative Exploratory Data Analysis ● Thinking Probabilistically- Discrete Variables ● Thinking Probabilistically- Continuous Variables 	Progress/Assessing Performance Update Google Doc with week's notes Upload screenshots of 4 Camp to Google Drive Folder
<i>Week 8: Nov 7 - Nov 13</i>	
DataCamp Course Work Statistical Thinking in Python Part 2 (3 hrs) <ul style="list-style-type: none"> ● Parameter estimation by optimization ● Bootstrap confidence intervals ● Introduction to hypothesis testing ● Hypothesis test examples ● Putting it all together: a case study 	Documenting Progress/Assessing Performance <ul style="list-style-type: none"> ● Update Google Doc with week's notes ● Upload screenshots of 4 completed exercises from Data Camp to Google Drive Folder ● Submit final assessment of my own performance using the above evaluation plan to Canvas.

Summary: The Python Fundamentals Final Skills Assessment will be integral in allowing me to assess my performance on mastering the fundamentals of Python (which include both basic and intermediate skills). Because I plan on finishing the entire "Python Fundamentals" course series on Data Camp, I feel confident that I will receive a passing grade on the assessment. Furthermore, I plan on developing my data cleaning and hypothesis testing skills through four additional courses. I chose these courses due to their relevance to the course and application to the replication project.

EXAMPLE 2

Semester Objective and Professional Reasoning: multivariate regression analysis, but along the way manipulate data from mixed methods studies as well as be comfortable with data visualizations (applicable to public policy, e.g. 2-dimensional density plot with viridis package multi-colored/ scatter density plot)

Method to Achieve: DataCamp Courses and Assessments for the major outcomes

Proof of Success: First, a screenshot of each course completed and exercises completed. Second, the ability to contribute to the replication project and my research in other classes by utilizing skills in R.

	Objective During Week	Assessment
9/21	Introduction to R	Complete course in Data Camp (4hrs) and explain action items to partner
9/28	Intermediate R	Complete course in Data Camp (6hrs) and explain action items to partner
10/5	Intro to Statistics with R	Statistics Fundamentals in R Assessment After Data Camp Course (4hrs) and explain action items to partner
10/12	Intro to Regression with R	Data Camp Course (4hrs) and explain action items to partner
10/19	Intermediate Regression with R	Data Camp Course (4hrs) explain action items to partner
10/26	Intro to Data Visualization with ggplot2	Data Camp Course (4hrs) and explain action items to partner
11/2	Data Visualization in R (comprehensive)	Data Camp Course (4hrs) and explain action items to partner
11/9	Week to work on replication and improve weak skill areas	Data Visualization with R Assessment and explain action items to partner

Action Items achievable in each course

Introduction to R

- 1. Learn how to use the console as a calculator and how to assign variables. Also know the basic data types in R
- 2. Create vectors in R, name them, select elements from them, compare different vectors
- 3. Create matrices and understand how to do basic computations with them
- 4. Create, subset, and compare factors (categorical data) in R
- 5. Create data frames, highlight specific variables and order them in meaningful matters
- 6. Create, subset, and name lists in R

Intermediate R

- 1. Build conditional statements by learning about relational objects in R and how to create “and” / “or” in logical operators
- 2. Learn about ‘if loops’ and ‘for loops’ and how to use them appropriately
- 3. Create functions in R and practice making my own
- Learn how and when to use ‘lapply’ function over a vector/list
- Learn functions to structure and manipulate data including ‘time’ and ‘date’

Statistics Fundamentals in R

- 1. Identifying common statistical distributions and simulating appropriate data
- 2. Understanding and implementing hypothesis tests
- 3. Understanding and implementing sampling techniques and their use in analysis
- 4. Using graphics to learn about the distribution of data and validate assumptions

Introduction to Regression in R

- 1. Fit simple linear regression models with numeric and categorical explanatory variables, and how to describe the relationship between the response and explanatory variables using model coefficients
 - 2. Learn regression to the mean and how to transform variables
 - 3. Learn to quantify the fit of model and diagnose issues using visualizations as well as observations influence and leverage on the model
 - 4. Learn simple logic regression and assessment using confusion metrics [Intermediate Regression in R](#)
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- 1. Learn parallel slopes regression with one numeric and one categorical explanatory variable
 - 2. Deal with Simpson’s paradox with multiple explanatory variables
 - 3. Implement linear regression algorithm for two explanatory variables
 - 4. Understand logistic distribution and be able to execute a logistic regression algorithm
- [Intro to Data Visualizations in R with ggplot2](#)

- 1. Understand the 7 grammatical layers and aesthetic mapping
- 2. Convert categorical and continuous variables into visual scales
- 3. Know the geometrics in R to create bar charts, scatter plots, and line plots

Data Visualization with R

- 1. Creating visualizations suited to numeric, categorical, or time series data types
- 2. Creating statistical visualizations
- 3. Creating plots on data-aware grids
- 4. Customization of plots to optimize communication of insights

Interactive Data Visualization with Plotly Bonus over Fall and Spring Semester break

<https://www.sharpsightlabs.com/blog/density-plot-in-r/>

EXAMPLE 3

Methods Learning Plan Proposal

My main goals for the semester:

- Expand my comfort zone skills: Gain skills in excel.
- Expand out of comfort zone skills: Gain beginner skills in Python
- Challenging skills I may not finish: Intermediate skills in Python Methods for reaching

my goals:

- Datacamp Modules
 - Spreadsheet Fundamentals
 - Python Fundamentals

Week	Work for the week	Way to track progress
9/14-9/21	DataCamp: Data Analysis in Spreadsheets (3 hours)	Screenshot of finished modules
9/21-9/28	DataCamp: Intermediate Spreadsheets (4 hours)	Screenshot of finished modules
9/28-10/5	DataCamp: Pivot Tables in Spreadsheets (4 hours)	Screenshot of finished modules
10/5-10/12	DataCamp: Data Visualization in Spreadsheets (4 hours)	Data Camp: Statement of Accomplishment Earned
10/12-10/19	DataCamp: Introduction to Python (4 hours)	Screenshot of finished modules
10/19-10/26	DataCamp: Intermediate Python (4 hours)	Screenshot of finished modules
10/26-11/2	DataCamp: Python Data Science Toolbox Part 1(4 hours)	Screenshot of finished modules
11/2-11/12	DataCamp: Python Data Science Toolbox Part 2(4 hours)	Python Programming Skill Assessment (screenshot results) Statement of Accomplishment Earned

Assessing my performance:

By November 12, 2021, I should have two Statements of Accomplishments from DataCamp along with screenshots from each week documenting my progress throughout the semester.

EXAMPLE 4

Objectives

My personal objectives for this learning plan throughout the course of the Analytical Methods class are the following:

- Be able to understand and master the basic applications of Microsoft Excel. These include the building blocks for data analysis, including, but not limited to, the basic functions of rows, columns, graphs, and formulas.
- Be able to summarize data based on measures of central tendency and dispersion.
- Be able to calculate and interpret z-scores of a distribution through Excel.
- Develop proficiency in statistical analysis and application of statistical terms in Excel.

These objectives are complementary to my career goals, which include working in monitoring and evaluation within the field of International Development. Furthermore, my background in organizing and program implementation during my undergraduate career allowed me to identify the gaps in my learning and skills, most of which pointed to a lack of familiarity with softwares like Excel. Not only do the aforementioned objectives tackle these gaps, but their design will allow me to use quantitative analysis throughout the rest of my career. Furthermore, for the purposes of the replication project, which requires exporting data from sources like the Heritage Foundation, the Organization for Economic Cooperation and Development, and the World Bank, Excel will prove to be a useful tool in conducting regression analysis (Quazi, Ballentine, Bindu, and Blyden 2018, 286-287).

Week of September 27, 2021

DataCamp - “Introduction to Spreadsheets” | Major Concepts: Basic working knowledge of Excel - rudimentary stages

- Throughout the first week of the learning plan, I will gain a thorough understanding of the most basic functions in Spreadsheets, including, not limited to, rows and columns, formulas, and exponents.

Weeks of October 4, 2021 and October 11, 2021

DataCamp - “Data Analysis in Excel” | Major Concepts: Introduction to Excel

- Throughout this course, I will learn how to use math functions, as well as Excel functions such as VLOOKUP, AVERAGEIF(S), and keyboard shortcuts. This will serve as a preliminary introduction to manipulating data, which will take place starting October 18. The contents of the course are “Exploring Data, Preparing Data,” and “Analyzing Data” (DataCamp, n.d.).

Weeks of October 18, 2021 and October 25, 2021

DataCamp - “Introduction to Statistics in Spreadsheets” | Major Concepts: Statistical Analysis and Visualization

- Throughout this course, I will learn to conduct hypothesis testing, visualize z-scores, apply statistical analysis in regards to measures of central tendency, correlations, and learn to manipulate graphics such as Histograms. The course contents include “Getting To Know Your Data, Statistical Data Visualization,” and “Statistical Hypothesis Testing” (DataCamp, n.d.).

Weeks of October 25, 2021 and November 1, 2021

DataCamp - “Pivot Tables in Spreadsheets” | Major Concepts: Organizing large data sets

- This course will give me a thorough understanding of pivot tables, including, but not limited to, organizing large data sets and manipulating minimum and maximum values, as well as measures of central tendency. The course contents include “Pivot Table Introduction in Sheets, How to manipulate pivot tables and data,” and “Advanced analysis in pivot tables” (DataCamp, n.d.).

Weeks of November 8

DataCamp - “Intermediate Spreadsheets” | Major Concepts: Applying transformations of functions in Spreadsheets

- Throughout the last week of this learning experience, I will learn how to conduct transformations of functions, including logarithmic, exponential, and square root transformations. This will aid in the process of regression analysis in the replication plan, which includes logarithmic transformations (Quazi, Ballentine, Bindu, and Blyden 2018, 286). Because this module includes three sections of course contents, given the weeklong timeframe to complete the learning plan, I will complete the second module of the course. The course contents include “Working with Numbers” (DataCamp, n.d.).

Assessing Completion

My assessment of my performance during the learning plan will be based on the following criteria:

- Provide documentation/proof of completion of the assigned modules (screen shots, PDFs)
- 1 screenshot/PDF for each completed module
- Provide a short paragraph or reflection about the overall satisfaction of the learning plan
- Provide proof of data manipulation through Excel by using the datasets used from the replication plan
- To measure performance, I will:
 - Use VLOOKUP and AVERAGEIF(S) on the replication dataset
 - Create a histogram with replication dataset
 - Show manipulation of a pivot table
 - Create a transformation of a function

Works Cited

Quazi, R. M., Ballentine, W. E., Bindu, F., & Blyden, L. (2019). Multilateral foreign aid, bilateral foreign aid, and foreign direct investment in Latin America. *International Journal of Economics and Financial Issues*, 9(2), 284-290.

DataCamp. n.d. "Data Analysis in Excel." Accessed September 14, 2021.
<https://learn.datacamp.com/courses/data-analysis-in-excel>

DataCamp. n.d. "Intermediate Spreadsheets." Accessed September 14, 2021.
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DataCamp. n.d. "Introduction to Spreadsheets." Accessed September 14, 2021.
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DataCamp. n.d. "Introduction to Statistics in Spreadsheets." Accessed September 14, 2021.
<https://learn.datacamp.com/courses/introduction-to-statistics-in-spreadsheets>

DataCamp. n.d. "Pivot Tables in Spreadsheets." Accessed September 14, 2021.
<https://learn.datacamp.com/courses/pivot-tables-in-spreadsheets>

EXAMPLE 5

Learning Goals:

To become proficient at cleaning, manipulating, and designing data for human visualization and consumption through the understanding of foundational methods and Python computational tools.

Cleaning Data:

Sort through data for relevant information

After development of the replication projects outline, I will collect the data and work with the team for two weeks to clean it.

Data will be cleaned with succinct documentation. A copy of the original data set will be saved for reference.

Organize concept appropriately

The new tidy dataset will be rearranged to be understood by Python instead of humans.

Data will not have missing values that will negatively affect the study.

Designing Data for Visualization:

Make data logical, engaging, and readable for humans

Adjust outline to include appropriate data visualizations for chosen replication project.

Create cohesive and attractive bar graphs, histograms, heat maps, area charts, and highlight table

Create common color palate and font choices to go between all group members

Understanding Methods:

Learn foundations for analyzing through weekly readings

Development of an editable replications outline citing key weekly readings for future reference

Once the replication project research paper has been picked, I will work with members of the team to build a flexible outline for the methods project including not only our methodologies and who is working on what at what time, but also what data visualizations we hope to develop during the process.

This is an ongoing project and will be expected to be referenced and updated weekly after article selection

Python:

Readable Functions | Comprehensions | Modules | Scopes and Namespaces | File Handling | Object-Oriented Programming (OOP) | Become familiar with the Pandas Library | Iterator, Generator, Decorators | Functions | Legible Documentation | Succinct Code | Merging Datasets | R Integration (rpy2)

Read *Python for Data Analysis (PDA)*, 2nd Edition by Wes McKinney an hour a week.

Timeline:

Key:

DataCamp: DC | *Python for Data Analysis*: PDA | Data Visualization: DV | Replication Project: RP

Week	Class Homework	Self-Learning/RP Actions	Coding Focus
9/14	Complete readings, draft learning plan	2-hour RP, 1 hour group meetup, attend Data and Donuts on Managing Research Data, office hour on Friday	2 Hour DC, 1 Hour PDA reading
9/21	Complete readings, finish learning plan proposal	2-hour RP, complete readings, confirm RP research	2 Hour DC, 1 Hour PDA reading
9/28	Complete readings: Probability and sampling, check chosen research for proper sampling methods	2-hour RP (collecting data, developing outline), 1 hour group meetup	2 Hour DC, 1 Hour PDA reading, submit first assessment screenshot
10/05	Complete readings: Inferential statistics & Hypothesis testing	2-hour RP (editing outline, cleaning data)	2 Hour DC, 1 Hour PDA reading
10/12	Complete readings: Inferential statistics II - Population and testing difference	2-hour RP (coding for math), 1 hour group meetup	2 Hour DC, Finish PDA
10/19	Complete readings: Bivariate linear regression	2-hour RP (coding for math, coding for visualization)	2 Hour DC
10/26	Complete readings: Multivariate regression,	2-hour RP (coding for visualization), 1 hour group meetup	2 Hour DC, begin DV if ready
11/02	Complete 11/02 readings and 11/09 readings: Introduction to computational social science methods, Introduction to computational social science methods	3-hour RP (finish coding, manipulating data), write draft of replication project	4 Hour DC, submit second assessment screenshot, cont., work on DV
11/09	I am getting married this week and will be unable to attend class. I will be turning in homework 11/02.	N/A	N/A
11/16	Complete readings: Best practices of fieldwork for qualitative researchers	3-hour RP, 1.5-hour group meetup, edit draft of replication report	2 Hour DC, data visualizations, cont. work on DV
11/23	Attend project consultation	3-hour RP, 1.5-hour group meetup, edit draft of RP, practice RP	2 Hour DC, cont. DV, DC project
11/30	RP presentation	Present RP, Verification report of other group's replication study	2 Hour DC, turn in finished DC project

Performance Assessment:

Final Python code utilizes at least two tidy data sets resulting in readable, well organized data displays for human understanding. I will make attractive and coherent data visualizations for the replication project. I will complete 2 assessments and one project for the DataCamp's Python Data Scientist career track and submit screenshots.

EXAMPLE 6

R Learning Plan Proposal

Learning Goal:

- My goal in this learning plan is to develop a baseline understanding of R and subsequent topics related to the use of R in data analysis. In order to do this, I will be utilizing courses on DataCamp.

Timeline and Tasks:

- **Week 1: 9/27 - 10/3** ○ Introduction to R (4hrs)
 - Intro to basics
 - Vectors
 - Matrices
 - Factors
 - Data frames
 - Lists
- **Week 2: 10/4 - 10/10** ○ Introduction to Importing Data in R (3hrs)
 - Importing data from flat files with utils
 - Readr & data.table
 - Importing Excel data
 - Reproducible Excel work with XLConnect
- **Week 3: 10/11 - 10/17** ○ Introduction to Regression in R (4hrs)
 - Simple linear regression
 - Predictions and model objects
 - Assessing model fit
 - Simple logistic regression
- **Week 4: 10/18 - 10/24** ○ Introduction to Data Visualization with ggplot2 (4hrs)
 - Introduction
 - Aesthetics
 - Geometries
 - Themes
- **Week 5: 10/25 - 10/31** ○ Cleaning Data in R (4hrs)
 - Common data problems
 - Categorical and text data □ Advanced data problems
 - Record linkage
- **Week 6: 11/1 - 11/7** ○ Introduction to the Tidyverse (4hrs)
 - Data wrangling
 - Data visualization

- Grouping and summarizing
- Types of visualizations **Assessment:**

- The success of my learning plan will be determined by weekly screenshots of my completion status in each course section.