CS 590 Special Topics: Programming and Data Science for Applied Research

	R programming	Python Programming
Time	*M, 1:30 - 2:45 pm*	*M, 3:00 - 4:15 pm*
Week 1 (9/9)	Anaconda Distribution Install and Overview; Anaconda Prompt Setup for Juptyer Notebook Install; Jupyter Notebooks and Course Overview	
Week 2 (9/16)	Introduction to R Basics Arithmatic in R Variables R Basic Data Types List Basics Strings Print Formatting Vector Basics Vector Operations Comparison Operators Vector Indexing and Slicing R Basics Training Exercise	Introduction to Python Basics Arithmatic in Python Variables Strings Indexing and Slicing with Strings Print Formatting List Basics Dictionary Basics Tuples with Python Sets in Python Booleans in Python Comparison Operators Python Basics Training Exercise
Week 3 (9/23)	R Basics Training Exercise - Solutions Introduction to R Matrices Creating a Matrix Matrix Arithmetic Matrix Operations Matrix Selection and Indexing Factor and Categorical Matrices Matrix Training Exercies	Python Basics Training Exercise - Solutions Introduction to Numpy Numpy Arrays Numpy Array Indexing and Slicing Numpy Matricies Numpy Matrix Arithmetic Numpy Matrix Operations Numpy Training Exercise
Week 4 (9/30)	Matrix Training Exercies - Solutions Introduction to R Data Frames Data Frame Basics Data Frame Indexing and Selection Data Frame Operations	Numpy Training Exercise - Solutions Introduction to Pandas Pandas Series Pandas DataFrame Basics Pandas DataFrame Operations
Week 5 (10/7)	Introduction to Data Input and Output with R CSV Files with R Excel Files with R SQL with R Web Scraping with R Data Frame Training Exercise	Introduction to Data Input and Output with Python I/O File Basics CSV Files with Pandas Excel Files with Pandas Web Scraping with Python Pandas Dataframe Training Exercise
Week 6 (10/14)	Data Frame Training Exercise - Solutions Introduction to Programming Basics (Part I)	Pandas Dataframe Training Exercise - Solutions Introduction to Programming Basics (Part I)

	IF, ELSE and ELSE IF Statements For Loops	IF, ELSE and ELIF Statements For Loops
Week 7 (10/21)	Introduction to Programming Basics (Part II) While Loops Functions Programming Basics Training Exercise	Introduction to Programming Basics (Part II) While Loops Functions Programming Basics Training Exercise
Week 8 (10/28)	Guest Lecturer: SQL Programming and Data Visualizations using Tableau	
Week 9 (11/4)	Functions Training Exercise - Solutions Advanced R Programming Built-in R Features Apply Math Functions in R Regular Expressions Advanced R Programming Training Exercise	Functions Training Exercise - Solutions Advanced Python Programming Built-in Python Features Lambda Expressions Map Function in Python Filter Function in Python Advanced Python Programming Training Exercise
Week 10 (11/11)	Advanced R Programming Training Exercise - Solutions Data Manipulation in R Dplyr Pipe Operator Tidyr Data Manipulation Training Exercise	Advanced Python Programming Training Exercise - Solutions Introduction to Object Oriented Programming in Python Attributes and Class Keyword Class Object Attributes and Methods Inheritance, Polymorphism and Special Methods Object Oriented Programming Training Exercise
Week 11 (11/18)	Data Manipulation Training Exercise - Solutions Data Visualizations with R ggplot2 Basics Two-variable plotting Corrdinates and Faceting Themes Interactive Plots with Plotly Data Visualizations in R Training Exercise	Object Oriented Programming Training Exercise - Solutions Data Visualizations in Python Matplotlib Seaborn Pandas Built-in Data Visualizations Plotly and Cufflinks Geographical Plotting Data Visualizations in Python Training Exercise
Weeks 12-14 (11/25 - 12/9)	Data Visualizations in R Training Exercise - Solutions Introduction to Machine Learning Linear Regression Logistic Regression K Nearest Neighbors Decision Trees and Random Forests Support Vector Machines Principal Component Analysis	Data Visualizations in Python Training Exercise - Solutions Introduction to Machine Learning Linear Regression Logistic Regression K Nearest Neighbors Decision Trees and Random Forests Support Vector Machines Principal Component Analysis

	K-Means Clustering Neural Networks	K-Means Clustering Neural Networks
Final (12/16)	2414 Williams Hall, Course Project Presentations	

Important Course Information:

Course GitHub Page: jcdunne/CS590 (Branches: Course Content, R, Python)

NBViewer (Jupyter.org): jcdunne/CS590 (Branches: R or Python)

Binder Rendering (mybinder.org): jcdunne/CS590 (Branches: R or Python)

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