Course Syllabus

Prerequisites

In order to be successful in this course, you will need to know how to program in Python. The expectation is that you have completed [Introduction to Data Science in Python](#), [Applied Plotting, Charting & Data Representation in Python](#), and [Applied Machine Learning in Python](#) so that you are familiar with the numpy and pandas Python libraries for data manipulation, matplotlib for plotting, and scikit-learn for machine learning.

Week by week

Module One introduces you to different types of networks in the real world and why we study them. You will cover the basic elements of networks such as nodes, edges, and attributes and different types of networks such as directed, undirected, weighted, signed, and bipartite. You will also learn how to represent and manipulate networked data using the NetworkX library. The assignment will give you an opportunity to use NetworkX to analyze a networked dataset of employees in a small company, their relationships, and preferences of movies to watch for an upcoming movie night.

In **Module Two** you will learn about how to analyze the connectivity of a network based on measures of distance, reachability, and redundancy of paths between nodes. This type of analysis will allow you explore the robustness of a network when it is exposed to random or targeted attacks such as the removal of nodes and edges. In the assignment, you will practice using NetworkX to compute measures of connectivity of a network of email communication among the employees of a mid-size manufacturing company.

In **Module Three** you will explore ways of measuring the importance or centrality of a node in a network. You will cover several different centrality measures including Degree, Closeness, and Betweenness centrality, Page Rank, and Hubs and Authorities. You will learn about the assumptions each measure makes, the algorithms we can use to compute them, and the different functions available on NetworkX to measure centrality. You will also compare the ranking of nodes by centrality produced by the different measures. In the assignment, you will practice choosing the most appropriate centrality measure on a real-world setting, where you are tasked with choosing a person from a social network who should be given a promotional voucher in order to maximize the impact of the promotion on the network.

In **Module Four** you will explore the evolution of networks over time. You will learn about different models that generate networks with realistic features such as the Preferential Attachment Model and Small World Networks. You will also explore the link prediction problem, where you will learn useful features that can predict whether a pair of disconnected nodes will be connected in the future. In the assignment, you will be challenged to identify which model generated a given network. Additionally, you will have the opportunity to combine different concepts of the course by predicting the salary, position, and future connections of the employees of a company using their logs of email exchanges.

Enrollment Options

Coursera has made the decision to make Specializations available by monthly subscription. This means you can choose to pay a monthly fee to access all of the courses in a specific Specialization. Coursera's switch to monthly subscriptions comes with another change -- for those learners who choose the "Audit Only" enrollment, you will no longer be able to submit assignments for grades nor see answers for those assignments. You will still have access to all the course materials but you will not be graded on your work, nor see answers to graded assignments. For further information on the different enrollment options for Coursera courses, please visit the Enrollment Options Help page. If you have feedback about the enrollment options shared on the Enrollment Options page, you can share your thoughts with Coursera in this survey.

Grading and Assignments

The lectures will provide you with some guidance for completing assignments, but you will need to take initiative and look beyond assignment instructions in order to be successful. You'll need to know how to ask questions in the discussion forums of your peers, and seek out new information through web searches and Stack Overflow. Be sure to also check out the Additional Resources. If you are not sure what kind of output is required, or think there is a need for more clarity, please head to the course discussion forums. Note that some assignments and in video quizzes may not be mobile friendly.

Course Item	Percentage of Final Grade	Passing Grade
Week 1 Quiz	5%	80%
Week 1 Notebook Assignment	18%	80%
Week 2 Quiz	5%	80%
Week 2 Notebook Assignment	18%	80%
Week 3 Quiz	5%	80%
Week 3 Notebook Assignment	18%	80%
Week 4 Quiz	5%	80%
Week 4 Notebook Assignment	26%	80%