Course Description:
With exploding healthcare costs, greater longevity and widespread health challenges of diabetes, obesity, cancer and cardiovascular disease, medicine and healthcare will be a primary scientific and economic focus for the remainder of this century. Informatics and data science offer the promise of a level of understanding of health, disease and treatment on a scale never before imagined. This course will address the big data techniques that are being used in the drug discovery, healthcare and translational medicine domains and will be organized around three questions: how can data science help researchers find new drugs and reuse old ones? How can data science help doctors treat patients better? And how can data science help us all lead healthier lives?

The course is broken down into sections, based around these questions, and modules. Each week of the course will focus on 1-3 modules. Each of these modules will have four parts: a Video, which gives an overview of the topic; Learning Goals that list what you should aim to know after completing the module; Learning Tasks that all students should complete in addition to watching the video, and Going Deeper that gives resources for advanced students and those that want to go deeper into the material.

Course Goals:
Students will: Understand the current scientific and human challenges of drug discovery, health and translational medicine; be able to describe the demonstrated or potential value of data science techniques in each of these areas; understand the specific opportunities afforded by crossing domain boundaries; be able to practically work with drug discovery and EMR data using the R statistics package and network visualization tools.

Prerequisites:
Students should have a good foundational knowledge of data science tools, including familiarity with the R statistical package, and at least some exposure to machine learning. Ability to program and some background in a healthcare field are desirable but not essential.