**Welcome to MDS 556 – Analytical Methods – Fall 2016**

Welcome to our course. I am looking forward to working with you once again as we begin our second journey into the mathematical side of data science. This entire course is focused on one primary outcome, giving you a richer mathematical toolset that will enable you to build better and more effective models. We will make use of a variety resources throughout the course, including high level topical overviews, deeper dives into the underlying mathematics, and case studies. You will once again complete a course project which can take one of many forms. You may extend the project work you did in MDS 549 if you wish or you may explore something new. We’ll get all of this settled by week three.

The course will break into three major components. The first three weeks will focus on model feature engineering, with a close look at mathematical techniques that can help you design sets of features that enable better model performance. This topical platform opens doors to some interesting mathematical content. While I am not assuming any knowledge of calculus or linear algebra, both of these subjects have roles to play in this level of our work. In the spirit of using our second week to focus on tools, I will provide a brief introduction to the fundamental ideas of linear algebra, with a little calculus added, enough so that you can at least make conceptual sense of the higher level material you may encounter. The middle weeks will focus on regression, beginning with a detailed look at the world of traditional multilinear regression and ending with an exploration of some more sophisticated approaches to regression that have use in modeling. The final segment of the course will focus on individual topics. As of now, I plan to cover time series analysis and take a quick at biology-based modeling techniques like neural networks and genetic algorithms. However, if you have a particular request with sufficient common interest, I will consider adding it to the mix during this last part of our course.

Our Webinars will be on Tuesdays this term, beginning this week, from 6:45 to 7:45 Central. I will provide a lecture each week and will also allow time for whatever conversation you wish to have. All Webinars will be recorded.

Once again, welcome back. I look forward to our time together.

Jim Kulich