I. Course Description

Analytics is the discovery and communication of meaningful patterns in data. This course will provide students with an analytics toolkit, covering concepts in probability and statistics while emphasizing the value and pitfalls of reasoning with data. Applications will focus on connections among analytical tools, data, and business decision-making.

The two main objectives of the course are to (i) introduce probability concepts that directly impact managers’ decision making skills in uncertain environments, and (ii) introduce statistical concepts that lay the foundation for data analysis done in Business Analytics II (DECS 431).

Students with a solid background in probability, statistics, and data work may prefer to waive DECS 430-5. Waiver exams will be given according to the Kellogg waiver exam schedule, communicated via Kellogg administration.

II. Assignments and Assessment

The deliverables for the course are listed below:

Homework Assignments – A homework assignment will be given at the end of each of the first four class sessions, and is to be completed prior to the next class session. Homework Assignments #1 and #4 will be GROUP assignments. Group membership will be randomly determined and posted to the course website. Assignments #2 and #3 will be INDIVIDUAL assignments. Each assignment will be worth 10% of the course grade (for a total of 40%).

Final Exam – Students will take the final exam on Thursday, September 20th. The final exam is worth 60% of the course grade.

III. Classroom Etiquette, Honor Code, etc.
Due to the nature of this course, students will occasionally need to have access to their laptops or tablets during class. However, students should not use these devices for anything other than class work and no electronic devices should be in operation during class time. Students requesting exceptions should contact the professor prior to the first class.

Classes will start promptly, and each student is expected to be prepared to begin at that time. Once class begins, you may leave the classroom only in case of an emergency. There will be a short break near the mid-point of each class session.

Students are expected to abide by Kellogg's Honor Code and Code of Student Etiquette at all times. Specific guidance on Honor Code issues will be provided during the quarter, as needed.

IV. Communications and other items

- Email is the best way to reach me if you have a question about the course, homework assignments, etc. I will get back to you ASAP.
- The course website will contain announcements, readings, course materials, etc. It will be updated after every class. In particular, complete slides from each class session will be posted after class for your review.
- If you would like to meet with me, please let me know. (If you like, you should feel free to propose a meeting time by sending me a meeting request via Outlook. If I cannot make that time, I will simply let you know, and we will work out another time.)
- Optional TA review sessions will be held for students needing additional review of concepts. An announcement of times/locations will be made.
V. Schedule

Session 1
Introduction and the Basics
- Data and Organizational Decision-Making
- Descriptive Statistics
- Rules of Probability
- Interpreting and Recognizing Conditional Probability

Session 2
Independence I
- Random Variables
- Expected Value, Variance
- Probability Distributions
- The Portfolio Problem

Session 3
Independence II
- Correlation and Covariance
- Business Applications of the Central Limit Theorem

Session 4
Sampling I
- Inferential Statistics
- Sample Size
- Hypothesis Testing
- Confidence Intervals

Session 5
Sampling II
- Sample Bias
- Adverse Selection
- Wrap-up, Summary and Review (bring your questions!)

Session 6
Exam