OR 531 Analytics & Decision Analysis

Fall 2017

Tuesday 7:20 – 10:00 pm, Planetary Hall, Room 206

Instructor: Paul Nicholas pnichol6@gmu.edu; http://mason.gmu.edu/~pnichol6/ Office hours are immediately before class in the SEOR Adjunct Faculty office, and on an as-needed basis with prior arrangement with the instructor. The course Teaching Assistant (TA), Aakriti Garg agarg6@gmu.edu should be contacted first.

Description: Course focus is predominantly on prescriptive analytics with some parts focused on predictive analytics. Topics include operations research techniques and their application to decision making such as mathematical optimization, network modeling, stochastic modeling, and multi-objective modeling. Other topics include computer simulation, decision analysis using decision trees, and quantitative value functions. Course uses contemporary computer software for problem solving. In particular, the course will extensively use MS Excel for solving decision making problems. Case-study approach to problem solving is used.

Prerequisites: Graduate standing.

Textbook: Business Analytics: The Art of Modeling with Spreadsheets, 5th Edition by Stephen G. Powell and Kenneth R. Baker. The previous edition of the text (entitled *Management Science*) is acceptable.

Software: This course requires **Frontline Analytic Solver Platform for Education**. The software is provided with the purchase of the above textbook. The instructor will provide instructions on how to download a free student version of the software (valid for 140 days). Note *this software requires Microsoft Excel*, and runs *only on Windows*. If you use a Mac, you must run the software on MS Excel for Windows using dual-boot or a virtual machine (e.g., VMWare Fusion, Parallels, etc.).

Class Format: This class is taught concurrently both in-person (Section 001) and via distance learning (Section DL1). Each class is broadcast live and recorded using Blackboard Collaborate. Students in either section may attend class in-person or remotely via Blackboard, but in-person attendance is strongly encouraged. The recorded sessions are available on Blackboard for viewing after class. All course material is available on Blackboard, and assignments are to be submitted electronically using Blackboard (not email).

Because of the distance learning component of this course, classes will be heavily dependent on the use of the lecture method with PowerPoint, and detailed, walk-through examples using MS Excel and Frontline Analytic Solver Platform. Students are encouraged to follow along using their personal laptops or tablets, but the instructor generally won't stop the class to address any software problems.

Grading
The course comprises eight projects worth 10 points each and a final exam worth 30 points (110 points total). Final grades are determined as follows: 90-100% = A. 80-89% = B. 70-79% = C. < 70% = F.

Academic Integrity
All students are expected to abide by the **GMU Honor Code**. Unless otherwise noted, all assignments are to be completed on an individual basis, with no coordination or discussion with any member of the class other than the course instructor and TA.

Course Schedule (subject to change)
- Week 1: Introduction, Excel basics
- Week 2: Linear optimization and intro to Frontline Analytic Solver Platform
- Week 3: Network optimization
- Week 4: Integer optimization
- Week 5: Heuristics
- Week 6: Sensitivity analysis and optimization review
- Week 7: Surveys, odds ratios, and logistic regression
- Week 8: Random numbers and Monte Carlo simulation
- Week 9: Supervised Learning
- Week 10: Unsupervised Learning
- Week 11: Queuing models
- Week 12: Decision trees
- Week 13: Visual Basic for Applications (VBA)
- Week 14: Guest lecture; course wrap-up