3. Teaching Interests

It is important to try new things, especially when there is no guarantee of immediate success. I feel I have been successful as an instructor in the classes that I have already been involved with; in this section, I provide mini-syllabi for other subjects that I might have a future opportunity to teach. These include a brief list of course objectives and topics as well as a basic assessment plan. Notice that objectives, topics and assessments will vary by whether the target student population is undergraduate (200 or 300 level) or graduate (400 level).

3.1. Statistics (200/300/400 level Math or Engineering)

- **Course Objectives:** At the completion of this course, students should …
  - be comfortable with basic/advanced statistical concepts such as single and multiple factor regression, analysis of variance (ANOVA) including confidence intervals, hypothesis testing and estimation.
  - be able to utilize a statistical software package (such as Minitab, SAS, SPSS, etc.) in obtaining useful insights through the analysis of data sets.

- **Covered topics to include (chosen appropriate to level):**
  - Populations vs. Samples.
  - Mean, variance, correlation, z-scores, and t-stats.
  - Confidence intervals vs. Prediction intervals.
  - Linear model theory and multiple regression.
  - ANOVA, in single and multiple factor models.
  - Hypothesis testing, MLE, bias, and likelihood-ratio tests.

- **Sample Assessment Plan:**
  - Weekly homework (200 & 300 levels) or biweekly problem sets (400 level) ~ 25%.
    ⇒ May include small quizzes to reinforce reading assignments.
  - Computer labs (application to data sets) ~ 10%.
  - Exams: Midterm ~ 20%, Final ~ 35%.

3.2. Stochastic Models (300/400 level IE/MS)

- **Course Objectives:** At the completion of this course, students should …
  - be able to model and analyze stochastic systems, with a focus on applications.
  - be able to calculate steady-state performance measures for stationary queueing models and identify when these measures are relevant.
  - (300 level) be able to utilize a simulation software package (such as Arena, SIMUL8, ProModel, etc.) in modeling discrete-event systems with stochastic interarrival and service/processing times.
• **Covered topics to include (chosen appropriate to level):**
  - Poisson processes, exponential distributions, and the memoryless property.
  - Renewal theory and regenerative processes.
  - Queueing models, ergodicity, limiting and steady-state distributions, and Little’s Law.
  - Random walks and Brownian motion.

• **Potential texts:**

• **Sample Assessment Plan:**
  - Weekly homework (200 & 300 levels) or biweekly problem sets (400 level) ~ 30%.
    ⇒ May include small quizzes to reinforce reading assignments.
  - Exams: Midterm ~ 30%, Final ~ 40%.

### 3.3. Operations Research (300/400 level Math or Engineering)

• **Course Objectives:** At the completion of this course, students should …
  - be able to analyze a described system and specify a mathematical model in which the objective is clearly defined (e.g., minimizing cost) subject to some identifiable constraints (e.g., resource allocation).
  - be able to provide analytical proof that a gathered solution is *optimal*, and explain what that means *in words*.
  - (300 level) be able to utilize an optimization package (such as Solver in Excel) in modeling systems as linear programs.

• **Covered topics to include (chosen appropriate to level):**
  - Linear programming and the simplex method.
  - Non-linear programming, including convexity, search techniques, Karush-Kuhn-Tucker (KKT) conditions, and Lagrange multipliers.
  - Decisions and risk analysis, including sensitivity.
  - Game theory, including Nash equilibrium, complete/incomplete information, and cooperation.

• **Sample Assessment Plan:**
  - Weekly homework (300 level) or biweekly problem sets (400 level) ~ 30%.
  - Exams: Midterm ~ 30%, Final ~ 40%.