MATH 356H Complete Schedule of Readings and Assignments

Note:
*Readings from Devore are labelled below as (D).
*Copies of Neter, Wasserman and Kutner (1st and 2nd editions - unfortunately the 3rd edition is out) have been placed on reserve in the Bata Library, together with the second edition of *Applied Linear Regression Models* by Neter and Wasserman (the content of this book is almost identical to the regression chapters of the other one, but it contains nothing on ANOVA). They are set for a 2-night loan, so plan ahead (just in case all are out when you go). For consideration to the others, do return the books on time. Three books for four people should be quite manageable.
*Readings from all three books by Neter et al. are labelled below as (NWK).

- Weeks 1 and 2 (Jan. 7 - Jan. 18). **Introducing the Simple Linear Regression Model**.
  - (D) Sections 12.1 and 12.2.
  - (NWK) Sections 3.6 and 3.7 regarding scope and random X (these are the sections recommended by Devore at the end of 12.2).
  - *Optional*: (NWK) Chapter 2 covers the equivalent material. I recommend Section 2.8 to see that the estimators by least squares are in fact also estimators my maximum likelihood. As you may recall, MLEs have very desirable properties.
  - Assignment #1 due Wednesday, January 23.
- Week 3 (Jan. 21 - Jan. 25). **Inferences on parameters and correlation**.
  - (D) Sections 12.3, 12.4, 12.5.
  - (NWK) Sections 3.1 and 3.2. Here you can see the proofs of all of the results from Section 12.3.
  - *Optional*: (NWK) Sections 3.3 to 3.5.
- Week 4 (Jan. 28 - Feb. 1). **Model validation**.
  - (D) Sections 13.1 and 13.2. Please note that formulas (13.2) and (13.3) should have + signs instead of -.
  - *Optional*:(NWK) Chapter 4 (skipping the F test for now). This is a very thorough analysis of residuals which is worth reading.
  - Assignment #2 due Tuesday, February 5.
- Week 5 (Feb. 4 - Feb. 8). **Matrix Approach to Regression.**
  - (NWK) Sections 6.8 to 6.13 (skipping ANOVA for now). The matrix approach allows you to visualize all the horrendous formulas in a nice, clear form. If you like Linear Algebra, you will enjoy learning about expectation and variance of random matrices, as well as performing least squares with them.
- Week 6 and Reading Week (Feb.11 - Feb. 22). **Multiple Regression.**
  - (D) Sections 13.3 and 13.4.
  - *Optional*: (NWK) Sections 7.1 - 7.7. You can see the estimators in matrix form here. The complete worked out example is worth reading in detail.

  - Assignment #3 due Tuesday, February 26 (after Reading Week).

- Week 7 (Feb. 25 - Feb. 29). **Other issues in multiple regression.**
  - (D) Section 13.5.
  - *Optional*: (NWK) Chapter 12. The equivalent to Section 13.5 in more detail.

- Week 8 (Mar. 3 - Mar. 7). **Single-Factor ANOVA.**
  - (D) Sections 10.1 and 10.2.
  - Assignment #4 due Tuesday, March 11.

- Week 9 (Mar. 10 - Mar. 14). **More on Single Factor ANOVA**.
  - (D) Section 10.3.
  - *Optional*: (NWK) Chapters 16 and 17 develop ANOVA as a linear model, as in Section 10.3 (not included in *Linear Regression Models*). This way of thinking about ANOVA makes it clear why ANOVA is covered in a class about linear models. Moreover, it is really the only way of thinking about ANOVA as the models become more complicated, since the formulas become impossible (see Section 11.3 of Devore).

- Week 10 (Mar. 17 - Mar. 21). **Two-Factor ANOVA**.
  - No office hours on Friday: Good Friday.
  - (D) Sections 11.1 and 11.2.
  - (NWK) Section 20.1 to 20.4. Section 20.8 gives the regression (with matrices) approach to ANOVA.
  - Assignment #5 due Tuesday, March 25.

- Week 11 (Mar. 24 - Mar. 28). **Non-parametric ANOVA**.
  - (D) Section 15.4.

- Week 12 (Mar. 31 - April 4). **Latin squares and 2^p Factorial Experiments.**
  - (D) The end of Section 11.3 (Latin squares) and Section 11.4. This material will not be on the final exam, but please read it. It will give you an idea of how closely the design of an experiment is connected with its statistical analysis.
  - *Optional*: (NWK) Part V is completely dedicated to Experimental Designs in incredible detail. There is enough material there for a complete course. You may want to skim some of it.
  - Assignment #6 due on Friday, April 4.

- Final exam period: 3 hour final exam.