AMS 550.400 MW 3:00 - 4:15 PM Room: Hodson 211

Last Compiled on September 8, 2012

Instructor: Dr. N. H. Lee (nhlee@jhu.edu)

Office Hours: To Be Arranged

Course Webpage: Blackboard will be utilized. Access it through the JHU portal:

http://my.jhu.edu

Required Textbook: Either an *electronic* or a *physical* copy is required for each of the following books:

- E. A. Bender, *An Introduction to Mathematical Modeling,*
- J. E. Miller, *The Chicago Guide to Writing about Multivariate Analysis.*

Prerequisites: Students are expected to have some exposure to:

- Probability and Statistics (550.310/550.311 or equivalent),
- Multivariate Calculus (110.202 or equivalent).

Grade Policy: I expect interest and enthusiasm from the students in this class. The class participation is 30%, which includes homework assignments, often for class discussion and your resume. The course project is 70%, which further breaks down as follows: a work statement (10%), a midterm presentation (10%), a progress report (10%), a final presentation (20%) and a final report (20%). The project must be approved by the instructor prior to your start of writing your work statement. The final presentation slides and the final report are to be typed in LaTeX using the course templates. The templates are distributed in class. The final presentation can be delivered in class if you prefer, but it is also allowed to be delivered by a video-recording as long as you have the necessary means to do so.

Course Objectives: This course has three objectives:

- To gain experience in mathematical modeling,
- To gain experience in presenting technical results,
- To be aware of effective technical typesetting tools.

For illustration of principles of mathematical modeling, anecdotes of successful mathematical models are discussed.

To facilitate developing a proper style for presenting technical results, adopted is a particular style of writing useful for summarizing a statistical analysis for multivariate data.

For effective typesetting tools, tutorials for Vim, LaTeX, Beamer, PGF/TikZ, R and Git may be given and for enhanced learning experience, these tools may be used throughout the class.

Equipment: You will need a computer with Git, LaTeX and R installed. If you have a laptop, you should install the most recent version of Git, R and LaTeX on it. This will be discussed. If you do not have your own laptop, R and LaTeX may be available in the Krieger labs and on computers in the AMS Computing Lab (on which AMS masters' students have priority). However, relying on the softwares in the Krieger labs and AMS Computing Lab is unlikely to be satisfactory.

Academic Honesty: The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition.

In this course, students are permitted and indeed encouraged to discuss homework problems with one another, but it is expected that the writing up of answers will be done privately. Copying by one student of another's homework solutions is considered an ethics violation in this course. Discussion of lecture material is strongly encouraged.

Report any violations you witness to the instructor. You may consult the associate dean of students and/or the chairman of the Ethics Board beforehand. See the guide on "Academic Ethics for Undergraduates" the Ethics Board web site for more information:

http://ethics.jhu.edu

University Attendance Policy: Students are expected to attend classes regularly. A student who incurs an excessive number of absences may be withdrawn from a class at the discretion of the professor:

http://www.jhu.edu/design/oliver/academic_manual/illness.html

In particular, each set of three missed classes is equivalent to 10% deduction in your grade. For example, if you have missed the total of three classes, then you can at most get B in your class. If six classes are missed, then C becomes the maximum grade possible. Upon the instructor's approval, you may be allowed to make up few classes by way of extra assignments such as writing book reports.

Important Dates:

Last day to add	Fri, Sep 14
Last day to drop	Sun, Oct 14
Fall Break Day	Mon, Oct 15
Classes meet according to Monday Schedule	Tue, Oct 16
Last day to withdraw	Fri, Oct 26
Thanksgiving vacation	Wed, Nov 21 – Sun, Nov 25
Reading period	Sat, Dec 8 – Tue, Dec 11

Tentative Schedule:

Monday	Wednesday	Friday
Sep 3rd *Labor Day*	5th **1** Overview	7th
10th **2** Seven Basic Principles	12th **3** Seven Basic Principles	14th *Due: Resume*
17th **4** Causality, Statistical Significance, and Substantive Significance	19th **5** Causality, Statistical Significance, and Substantive Significance	21st
24th **6** Five More Technical Principles	26th **7** Five More Technical Principles	28th *Due: Work Statement*
Oct 1st **8** Creating Effective Table	3rd **9** Creating Effective Table	5th
8th **10** Creating Effective Chart	10th **11** Creating Effective Chart	12th *Due: Midterm Presentation*
15th *N.B. Fall Break* Choosing Effective Examples and Analogies	17th **12** Choosing Effective Examples and Analogies	19th
22nd **13** Basic Types of Quantitative Comparisons	24th **14** Basic Types of Quantitative Comparisons	26th *Due: Progress Report*
29th **15** Quantitative Comparisons for Multivariate Models	31st **16** Quantitative Comparisons for Multivariate Models	Nov 2nd

Monday	Wednesday	Friday
5th **17** Choosing How to Present Statistical Test Results	7th **18** Choosing How to Present Statistical Test Results	9th
12th **19** Arguments from Scale	14th **20** Arguments from Scale	16th *Due: Final Presentation*
19th **21** Graphical Methods	21st *Thanksgiving Break Begins*	23rd
26th **22** Graphical Methods	28th **23** Basic Optimization	30th *Due: Final Report*
Dec 3rd **24** Basic Optimization	5th **25** Basic Optimization	7th