1. Course Information

- Instructor: Ying Hung
- Office: Hill Center 463
- Office Hours: **Tuesday 10:00-11:00** or by appointment
- Email: yhung@stat.rutgers.edu
- *An Introduction to Statistical Learning with Applications in R*. This book is an easier version of *The Elements of Statistical Learning*. You can visit the website of the book: [http://www-bcf.usc.edu/~gareth/ISL/](http://www-bcf.usc.edu/~gareth/ISL/)
- Software: R. Free software available at [http://www.r-project.org/](http://www.r-project.org/). If you go to Manuals on the left panel of the website, you will find a good introduction *An Introduction to R*.
- Course work: reading, assignments, quiz and a final project.
- Grades:
  - (1) Homework (40%): There will be 5 homework due in class.
  - (2) In-class quiz (30%): There will be 2 in-class quiz.
  - (3) Final project (30%):
    - formulate a group: three members each group
    - proposal 1 (5%): formulate the problem
    - proposal 2 (5%): obtain some preliminary results
    - presentation (10%): present your results
    - final paper (10%): finalize your results
- Rules of the class
  - (1) No late homework will be accepted.
  - (2) Students are encouraged to discuss the homework with classmates, the TA and the instructor. But each student needs to hand in an independent homework by himself/herself.
  - (3) When you send an email about this course, please use the title “FSRM 588: ”. This allows the instructor and the TA to reply to these emails with priority.
  - (4) When there is any problem with grading, please talk to the TA who grades the homework. If the problem is not resolved, submit a written request explaining the grading problem and also include a copy of your solution.
- Comments
  - (1) All students are required to read either the textbook or the recommended reference.
(2) The lectures will be based on the combination of the textbook, recommended reference and additional materials prepared by the instructor.

2. Syllabus (tentative)

(1) **Introduction to Statistical Learning** (Chapter 1 in ESL)
(2) **Supervised Learning: Linear Methods**
   - *Introduction to Supervised Learning* (Chapter 2 in ESL; Chapter 2 in ISL.)
   - *Linear Regression* (Chapter 3 in ESL; Chapter 3 in ISL.)
   - *Model Assessment and Selection* (Chapter 7 in ESL; Chapter 5 in ISL.)
   - *Linear Models for Classification* (Chapter 4 in ESL; Chapter 4 in ISL.)
   - *Penalized Regression Methods* (Chapter 3 in ESL; Chapter 6 in ISL.)
   - *Model Inference and Averaging* (Chapter 8 in ESL; Chapter 5 in ISL.)
(3) **Supervised Learning: Nonparametric Methods**
   - *Basis Expansions and Regularization* (Chapter 5 in ESL; Chapter 6 in ISL)
   - *Kernel Smoothing Methods* (Chapter 6 in ESL; Chapter 6 in ISL.)
(4) **Supervised Learning: Advanced Methods**
   - *Additive Models, Trees* (Chapter 9 in ESL; Chapter 8 in ISL.)
   - *Random Forest* (Chapter 15 in ESL; Chapter 8 in ISL.)
   - *Support Vector Machine* (Chapter 12 in ESL; Chapter 9 in ISL.)
(5) **Unsupervised Learning**
   - *Unsupervised Learning* (Chapter 14 in ESL; Chapter 10 in ISL.)
(6) **High-dimensional Problems** (Chapter 18 in ESL; Chapter 6 in ISL.)
(7) **Project Presentation**