MATHEMATICS 546 SYLLABUS - FALL 2017
TH 4:30 - 5:45 pm, SAS 2225

INSTRUCTOR
Min Kang, (office: SAS 4114, Ph #: 919-515-7891, email: kang@math.ncsu.edu)

TEXTBOOK
"Probability Essentials" written by J. Jacod and P. Protter.

PREREQUISITES
Advanced Calculus, Basic Real Analysis Background(MA 425 or MA 511) and Elementary Probability Theory (MA 421). For mathematics majors intending to continue to MA 747, it is better to have the analysis sequence (MA 515-715) and solid measure theory background.

CONTENT
This course covers the following topics: discrete/continuous probability theory including random variables, conditioning, independence and limit theorems in the context of independent random variables, random vectors in general set-up, probability distributions and conditional expectations, characteristic functions, Poisson processes, square integrable random variables, Gaussian systems, sums of independent random variables and limit theorems, laws of large numbers and central limit theorems. If time permits, we may include discussions on ergodic theory and large deviations.

PLAN
1. **Aug. 16 - Sep. 1** : Basic Probability Theory (Probability Space, Probability Measure, Sigma Algebra)
2. **Sep. 4 - Sep. 22** : Random Variables and Related Notions (Distribution, Expectation, Sequence of Random Variables)
3. **Sep. 25 - Oct. 18** : Useful Theorems and Tools (Chebyshev Inequality, Weak Law of Large Numbers, Borel-Cantelli Lemma, Basic Real Analysis Background)
4. **Oct. 20 - Nov. 8** : Characteristic Functions and Random Vectors (Residue/CauchyTheorem from Complex Analysis, Characteristic Functions, Density Functions)
5. **Nov. 10 - Dec. 1** : Strong Law of Large Numbers, Central Limit Theorem, Conditional Expectations

HOMEWORK
Homework will be assigned and collected once every three or four weeks, usually on Thursdays. It is the students' responsibility to do the homework. For the homework problems, check the corresponding course homework web page. Late homework will NOT be accepted.

MIDTERMS
There will be two 75-minute midterm tests: the first test on Tuesday, 09/26/2017 and the second on Tuesday, 11/07/2017. All midterm tests will be at SAS Hall 2225, 4:30 pm - 5:45 pm. There will NOT be any make-up midterm. These are closed-book exams without any form of aid allowed.

FINAL EXAM
The final is given on December 7, 2017 (Thursday), 1:00 pm - 4:00 pm in SAS 2225. The instructor is not allowed to schedule a make-up final exam. Students must arrange their schedule to avoid any conflict with other finals. The final exam is cumulative, including the whole material covered throughout the semester. The final is a closed-book exam without any form of aid allowed.

GRADE

Homework Assignments 20 %, Two Midterms 46 % together, Final 34 %. All the exams are curved including the final and the letter grades.

OFFICE HOURS

Tuesdays 1:00 pm - 3:00 pm or by appointments.

ACCOMMODATION OF DISABILITY

Reasonable accommodation will be given to the students with learning disabilities. The students with the learning disability should contact Disability Services at Student Health Center Suite 1900, Campus Box 7509, 515-7653.