

# Probability and Statistics

**Time** Wednesday 1000-1200

**Classroom** N107, IIS, AS

**Textbook** Robert V. Hogg and Elliot This, Probability and Statistical Inference (9th version)

**Reference books** Sheldon Ross, A first course in probability (9th version)

**Grading** Homework 40% Midterm 30% Final 30%

**Office hour** By appointment

- Lecturers**
- I-Wei Lai <iweilai0924 at gmail.com>
  - Hong-Han Shuai <hhshuai at arbor.ee.ntu.edu.tw>
  - Wei-Ho Chung <whc at citi.sinica.edu.tw>
  - Ronald Y. Chang <rchang at citi.sinica.edu.tw>
  - Kate Ching-Ju Lin <katelin at citi.sinica.edu.tw>

## Syllabus

Week	Date	Topics/Brief Description	Lecturers
1	2015/09/16	<b>Introduction to Probability and Statistics</b>	Kate Lin
2	2015/09/23	<b>1. Probability</b> 1.1 Properties of Probability 1.2 Methods of Enumeration 1.3 Conditional Probability 1.4 Independent Events 1.5 Bayes' Theorem  <b>2. Discrete Distributions</b> 2.1 Random Variables of the Discrete Type 2.2 Mathematical Expectation 2.3 Special Mathematical Expectations 2.4 The Binomial Distribution 2.5 The Negative Binomial Distribution 2.6 The Poisson Distribution  <b>3. Continuous Distributions</b> 3.1 Random Variables of the Continuous Type 3.2 The Exponential, Gamma, and Chi-Square Distributions 3.3 The Normal Distribution 3.4 Additional Models  <b>4. Bivariate Distributions</b> 4.1 Bivariate Distributions of the Discrete Type 4.2 The Correlation Coefficient 4.3 Conditional Distributions 4.4 Bivariate Distributions of the Continuous Type 4.5 The Bivariate Normal Distribution	Lai
3	2015/09/30		Lai
4	2015/10/07		Lai
5	2015/10/14		Shuai
6	2015/10/21		Shuai
7	2015/10/28		Shuai
8	2015/11/04		Ronald

9	2015/11/11	<b>Midterm</b>	
10	2014/11/18	<b>5. Distributions of Functions of Random Variables</b> 5.1 Functions of One Random Variable 5.2 Transformations of Two Random Variables 5.3 Several Random Variables 5.4 The Moment-Generating Function Technique 5.5 Random Functions Associated with Normal Distributions 5.6 The Central Limit Theorem 5.7 Approximations for Discrete Distributions 5.8 Chebyshev's Inequality and Convergence in Probability 5.9 Limiting Moment-Generating Functions  <b>6. Point Estimation</b> 6.1 Descriptive Statistics 6.2 Exploratory Data Analysis 6.3 Order Statistics 6.4 Maximum Likelihood Estimation 6.5 A Simple Regression Problem 6.6 Asymptotic Distributions of Maximum Likelihood Estimators 6.7 Sufficient Statistics 6.8 Bayesian Estimation 6.9 More Bayesian Concepts	Ronald
11	2015/11/25		Ronald
12	2015/12/02		Chung
13	2015/12/09		Chung
14	2015/12/16		Chung
15	2015/12/23	<b>7. Interval Estimation</b> 7.1 Confidence Intervals for Means 7.2 Confidence Intervals for the Difference of Two Means 7.3 Confidence Intervals for Proportions 7.4 Sample Size 7.5 Distribution-Free Confidence Intervals for Percentiles 7.6 More Regression 7.7 Resampling Methods  <b>Introduction to Hypothesis Testing</b>	Lin
16	2015/12/30		
17	2016/01/06		
18	2016/01/13	<b>Final</b>	----