數學系課程核心教材內容

課程名稱：(中文）統計方法 (英文）Statistical Methods				開課單位	學士班
				課程代碼	2103711
學分數	3	必/選修	選修	開課年級	二
教學目標與課程概述：The course is an introduction to the basic concepts and methods of statistical methods and data analysis. It is intended for (senior) undergraduate students who either have no prior statistics courses (math skills assumed), or who wish to review the fundamentals before taking additional advanced statistics courses. 先修科目或先備能力：機率論或機率模型					
建議參考書目	An Introduction to Statistical Methods and Data Analysis by R. Lyman Ott and Michael Longnecker; A Data-Based Approach to Statistics by Ronald L. Iman				

課程大綱

單元主題	內容綱要	上課週數
Introduction; Data Skills; Descriptive Statistics	An overview of Statistics, Data description and plots, Measures of central tendency and variability, Empirical rule, Boxplot	1
Probability and Probability Distributions	Review of probability, Property of Probability, Conditional probability and independence, Types of random variables, Probability density function and cumulative distribution function, Binomial distribution, Normal distribution	1
Statistic and Sampling Distribution	Sampling distribution of the sample mean, sampling distribution of the sample mean when the population is normal, Central Limit Theorem, Normal approximation to Binomial	2
One-sample inference about population mean	Point estimation for population mean, confidence interval, t-distributions, null and alternative hypothesis, Type I and Type II error, Power of test, One-sample z-test, One-sample t-test	2-3
Two-sample inference about two population means	Independent samples and Paired samples, point estimation and confidence interval for μ_1-μ_2, Two-sample z-test, Two-sample t-test, Paired t-test	2-3
Inference about population proportion	One sample point estimation, confidence interval, Large-sample test for a population proportion, comparing two population proportions	1-1.5
Inference about population variances	Point estimation for a σ^2, Chi-square distribution, Confidence interval for the variance of a normal population, Test concerning two population variances	1-1.5
Regression analysis: Simple linear regression	Introduction to regression models, simple linear regression model, Estimating regression parameters, Residuals, ANOVA table and F-test in simple linear regression, Correlation coefficient	2