數學系課程核心教材內容

課程名稱：(中文) 統計軟體與應用 (英文) Statistical Computing Languages and Software				開課單位	統科碩士班
				課程代碼	2315730
學分數	3	必/選修	選修	開課年級	一
教學目標： The course is intended primarily for graduate students to learn how to use statistical computing tools and/or some techniques of modern statistical methodology. 課程概述：Software tools useful for statistical computing will be introduced. These will include R/S-PLUS. The focus will be on using these tools for statistical analysis and simulation studies. In addition, a tutorial of LaTex will be introduced. 先修科目或先備能力：					
建議參考書目	Handouts; SimpleR –Using R for Introductory Statistics (Free documentation from R website) An Introduction to R: Software for Statistical Modelling and Computing (Free documentation from R website)				

課程大綱

單元主題	內容綱要	上課週數
Introduction to R	Overview of R/S-PLUS	1
Data Objects in R; R Expressions	Basic logical and arithmetic operators, Built-in Data in R, Creating Data into R	1
Bulit-in Functions in R	Creating matrices and arrays, matrices and arrays computations, List, Subscripting , Naming the rows and columns of matrices, Some other useful commands	1-2
Graphics in R; Data Analysis	Exploratory Data Analysis, Standard summary descriptions and plots (histograms, Scattor Plot, Smoothing, Symmetry Plot, Quantile-Quantile Plot); Displaying multivariate data, Kernel density estimation	2
Writing R Functions	How to write your own functions in R, Programming constructs: Conditional statements, Loops in R (for loop, while loop, repeat loop); Interactive methods (e.g. Newton-Raphson)	2-3
Classical statistical analysis	Probability distributions in R, Commonly-used hypothesis testing and estimation available in R, Regression analysis in R (model performing, residual plots, factors in R, dummy codes in R)	2-3
Simulations and Bootstrap	Generating random numbers, Simulations, Bootstrap methods, Principles of efficient programming	2
LaTex Tutorials	Packages, Text formatting, Mathematics typing, Inclusion of Graphics in LaTex,	1