數學系課程核心教材內容

課程名稱：(中文) 存活分析 (英文) Survival Analysis				開課單位	統科碩士班
				課程代碼	2315743
學分數	3	必/選修	選修	開課年級	一

教學目標 與 課程概述：The objective of this course is to provide an introduction to the statistical modeling and analysis of lifetime or time to event data. Course contents are expected to include most of Chapters 1-6 and part of Chapter 7 from the textbook. However, some additional materials will be provided. There will be some amounts of theory and a blend of application. The applications will emphasize using software (mostly R) to carry out the data analysis.

先修科目或先備能力：

建議參考書目	1. Survival Analysis Using S by Mara Tableman and Jung Sung Kim 2. Modelling Survival Data in Medical Research by Collett 3. Techniques for Censored and Truncated Data by John P. Klein and Melvin L. Moeschberger

課程大綱

單元主題	內容綱要	上課週數
Introduction to Survival Data	Introduction to time to event data, Why needs special methods for time to event data, Censoring issues, Basic definitions of survival function, hazard function both for discrete case and continuous case	2
Nonparametric Methods for Survival Data	Empirical survival estimates. Kaplan-Meier estimator, Estimates for mean survival time, quantiles and survival probability, Efron Bootstrap procedures for K-M estimates	3
Parametric Models for Survival data	Likelihood function with right censoring, Maximum likelihood estimation for certain distributions (exponential, weibull, log-normal etc.); Relationship between scale-shape family and location-scale family, Construction of quantile-quantile plots	3
Two-sample problem	Nonparametric: log-rank test, peto test, Gehen-Wilcoxon test, Fleming-Harrington test Parametric: likelihood ratio test	2
Parametric Regression Models;	Exponential and Weibull regression models, Cox proportional hazard model, Interpretation of a fitted proportional hazards regression Model, Stratified Cox ph model, Accelerated failure time model	3
Assessment of Model Adequacy	Residual analysis: Cox-Snell residuals, Martingale residuals, Deviance residuals, dfbeta; Graphical check, test for PH assumption	2