

課程名稱： 統計計算 (Statistical computing)

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一、 教學目標：

Computational statistics and statistical computing are two areas that employ computational, graphical, and numerical approaches to solve statistical problems. This course is **not** about the use of pre-packaged statistical software. It covers an introduction to some of the traditional core material of statistical computing “methods”, with an emphasis on using the R language (<http://www.r-project.org/>) via an examples-based approach. You will be expected to be able to understand the Rcode and apply the basic structure of the code to new problems assigned as homework.

二、 教材內容：

1. Introduction to R
2. Generating Random Numbers
3. Monte Carlo Integration and variance reduction
4. Monte Carlo Methods for Inferential Statistics
5. The Bootstrap and Jackknife
6. Permutation methods
7. Cross-Validation
8. Markov Chain Monte Carlo: The Metropolis-Hastings algorithm, Gibbs sampler.
9. EM algorithm

三、 實施方式： 課堂上課,作業與上機演練

四、 參考書目：

- (a) Rizzo, M. L. (2007), Statistical computing with R, Chapman and Hall/CRC. (Author’s web page for the book <http://personal.bgsu.edu/~mrizzo/M758/M758.htm>)
- (b) Jones, O., Maillardet, R. and Robinson, A. (2009), Introduction to Scientific Programming and Simulation Using R, Chapman and Hall/CRC. <http://www.ms.unimelb.edu.au/spuRs/>
Installing an R Development Enviroment on Heterogenous Systems <http://statmath.wu.ac.at/software/R/qfin/>