

STAT5330: 統計計算 (Statistical Computing)

Lecture: Tuesday 9-12am
綜合三館 837

Instructor: 徐南蓉 njhsu@stat.nthu.edu.tw

Website: NTHU eeclass 數位學習平台 <https://eeclass.nthu.edu.tw/>

Course Topics:

This course covers modern computational methods and practices for statistical analysis. Topics include random number generation, Monte Carlo simulation, Bayesian inference, optimization, Gaussian process, visualization, and data management. A tentative schedule is following:

week	Topic	HW/Lab
1	Introduction	
1	Lecture 1: Random number generation	R introduction
2	Lecture 2: Gibbs sampling	R markdown
3	228 放假	Hw1
4	Lecture 3: Metropolis algorithm	
5	Lecture 4: Distribution and Expectation	Hw2 R ggplot
6	Lecture 5: Monte Carlo simulations in statistical inference	
7	Midterm (open book 上機考試)	R shiny
8	兒童節 放假	
9	Lecture 6: Bayesian inference	Hw3
10	Lecture 7: Optimization	
11	Lecture 8: EM	HW4
12	Lecture 8: Optimization & EM	R package
13	Lecture 9: Gaussian process and its application	
14	Lecture 9: Gaussian process and its application	HW5
15	Lecture 10: Introduction to SQL	
16	No class (office hours)	

17	Final project: R Shiny/package Demo Show	
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Grading: HW 60%; Midterm 20%; Final Demo 20%. (HW and Final 皆為個人作業)

References:

- The Elements of Statistical Learning (2009), Hastie, Tibshirani and Friedman, Springer.
- Bayesian Data Analysis (2004), Gelman, Carlin, Stern and Rubin, Chapman & Hall.
- Convex Optimization (2004), S. Boyd and L. Vandenberghe, Cambridge University Press.
- R For Data Science (2017), Wickham and Grolemund. <https://r4ds.had.co.nz/>

Requirement: This course is designed for graduate students in statistics. Mathematical statistics is required for taking this course.