

Stats 102C Introduction to Monte Carlo Methods

Course CCLE site: <https://ccle.ucla.edu/course/view/16S-STATS102C-2>.

Instructor: Qing Zhou (zhou@stat.ucla.edu), OH: M 4:45–6 pm MS 8979.

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Prerequisite: Stats 100B and 102B (recommended). Programming skills (R, by default).

Grading

Your final grade of this course will be composed of three parts:

1. Homework assignments (20%). We will have biweekly assignments. Some problems need computer programming.
2. Midterm exam (30%, in-class). Friday, April 22.
3. In-class final exam (30%). Friday, June 3.
4. Take-home final exam (20%). Exam week.

Letter grades: top 20% (A range), 20% – 70% (B range), below 70% (C or below C).

Topics

Introduction to Monte Carlo algorithms for scientific computing. The topics are grouped into six chapters:

1. Introduction and Examples: motivations of the course with examples.
2. Generating Random Variables: inverse cdf, rejection sampling, and normal.
3. Importance Sampling and its applications, sequential Monte Carlo.
4. Introduction to Markov Chains: theory, examples, and convergence.
5. The Metropolis-Hastings algorithm: algorithm, diagnostic, special designs.
6. The Gibbs Sampler: conditional distributions, examples, applications in missing data.

References

- Lecture notes: Will be posted on CCLE weekly.
- (Optional) Robert C.P. and Casella, G (2010) *Introducing Monte Carlo Methods with R*. Springer.
- (Optional) Karlin S and Taylor HM (1998) *An introduction to stochastic modeling*, Academic Press.

Academic Integrity

As a student and member of the University community, you are here to get an education and are, therefore, expected to demonstrate integrity in your academic endeavors. All students must uphold University of California Standards of Student Conduct as administered by the Office of the Dean of Students. Students are subject to disciplinary action for several types of misconduct, including but not limited to: cheating, multiple submissions, plagiarism, prohibited collaboration, facilitating academic dishonesty, or knowingly furnishing false information. You must finish homework assignments and exams independently.

For more information about academic integrity, please see www.deanofstudents.ucla.edu.