

General Information on the Course MA 323

Semester: July–November, 2022

1 Lab Assignment and Submission

The lab assignments will be given on each Wednesday by 10 am starting from August 03, 2022. You need to submit the worked out assignment. Please prepare a single report (in PDF format only) for all the questions and submit it. Also, please submit the codes for individual questions. Therefore, if there are 2 questions in an assignment, you are supposed to submit three files (one report and two codes) for the assignment. The report should include all mathematical derivations, figures, conclusions. There should not be any code in the report. The codes should be well commented for easy readability. Your program should be written in such a way that there is only one program for each question and all the outputs for each question should be displayed by running the program once only.

The last date (and time) of submission will be mentioned in each assignment. Please keep all the files in the appropriate directory at the server 172.16.70.1. You can modify it as many times as you want before the deadline. The files will be collected from the folder just after the deadline. The modification requests after the deadline will not be entertained.

2 Examinations and Grading Policy

There will be two quizzes and two lab examinations throughout the semester. The weightage of several examinations and assignments are given in the following table. The schedule of the examinations are also mentioned in the table. Finally, the letter grades will be awarded based on total marks obtained after the completion of the semester following a relative grading scheme.

Item	Weight	Date	Time
Quiz I	15%	September 13, 2022	14:00 – 14:55 hours
Lab Examination I	30%	September 14, 2021	10:00 – 12:00 hours
Quiz II	15%	Will be given by Dr. Dey	–
Lab Examination II	30%	Will be given by Dr. Dey	–
All assignments	10%	–	–

3 Syllabus

Principles of Monte Carlo; Generation of random numbers from a uniform distribution - linear congruential generators and its variations; Generation of discrete and continuous random variables - inverse transform and acceptance-rejection method; Simulation of univariate normally distributed random variables - Box-Muller and Marsaglia methods; Generation of multivariate normally distributed random variables - Cholesky factorization. Generation of geometric Brownian motion and jump-diffusion sample paths. Variance reduction techniques; Quasi Monte Carlo - general principles and low discrepancy sequences.

4 Reading Materials

- Text Books

1. P. Glasserman, Monte Carlo Methods in Financial Engineering, *Springer*, 2004.
2. R. U. Seydel, Tools for Computational Finance, 5th Ed., *Springer*, 2012.

- Other

1. <https://statweb.stanford.edu/~owen/mc/>

5 Resource Persons

- Instructors: Dr. Arabin Kumar Dey (Email:arabin@iitg.ac.in) and Ayon Ganguly (Email: aganguly@iitg.ac.in, Phone: 0361-258-2639)
- Tutor: Ms. Shilpi Biswas (Email: shilpi.biswas@iitg.ac.in)