General Information on the Course MA 323
Semester: July–November, 2021

1 Welcome Note

Welcome to the course Monte Carlo Simulation (MA 323). As you know that all the courses in the current semester (July–November, 2021) will be taught online, this course will be handled mainly using Microsoft Office 365.

2 Lectures and Study Materials

I have created a group named `Grp_MA323_2021` on Microsoft Teams to conduct various activities of the course. Please join the group. To join the group please follow the following steps:

1. Login to Microsoft Teams.
2. Click on `Join or create team`.
3. Choose the option `Join a team with a code`.
4. Use the code `zky8w30`.

Video lectures will be released on each Monday (tentatively) starting from August 02, 2021. You are expected to listen the lectures and try to understand the concepts. The videos will be uploaded on Microsoft Streams and Dropbox. To get the videos, please click here for Microsoft Streams Channel and click here for Dropbox link. Note that if you do not join the group on Microsoft teams, you may face issues realted to authorization to visit the video lectures on Microsoft Streams. Class notes, lab assignments and other necessary materials will be uploaded on `Grp_MA323_2021` at Microsoft teams.

3 Lab Assignment and Submission

The lab assignments will be uploaded at `Grp_MA323_2021` on each Wednesday at 10 am starting from August 04, 2021. You need to submit the worked out assignment through the assignment tab of the same group. The last date (and time) of submission will be mentioned in each assignment. Please submit a single report (in PDF format only) for all the questions. 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.

4 Doubt Clearing Session

The doubt clearing session will be conducted on each Wednesday starting from 10:00 am through `Grp_MA323_2021` on Microsoft Teams. The first doubt clearing session will be conducted on August 04, 2021.

5 Examinations and Grading Policy

There will be two quizzes and two lab examinations throughout the semester. The examinations will be handled through assignments in Microsoft Teams. 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 22, 2021	9–10 hours
Lab Examination I	30%	September 22, 2021	11–13 hours
Quiz II	15%	November 24, 2021	9–10 hours
Lab Examination II	30%	November 24, 2021	11–13 hours
All assignments	10%	–	–

6 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.

7 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/

8 Resource Persons

- Instructor: Ayon Ganguly (Email: aganguly@iitg.ac.in, Phone: 0361-258-2639)
- Tutor: Ms. Shilpi Biswas (Email: shilpi.biswas@iitg.ac.in)

9 Final Remark

The above policy and/or schedule may change due to unforeseen issues and/or difficulties.