MEM6810 Engineering Systems Modeling and Simulation
工程系统建模与仿真

Sino-US Global Logistics Institute
Shanghai Jiao Tong University

Spring 2022

Course Syllabus

Course Type

- For Full-Time Master Students
- 3 Credits
- 48 Teaching Hours

Course Description

The class for full-time master students focuses more on the theory and analysis. It covers classical concepts and theories in discrete-event system simulation, mainly including queueing models, random variate generation, input modeling, and output analysis. Moreover, some algorithms for simulation optimization together with their analysis are touched. It also provides basic training on conducting simulation in Microsoft Excel and FlexSim, with applications in logistics and supply chain.

Instructor Info

- SHEN Haihui 沈海辉
- Office: Middle Hall 305
- Email: shenhaihui@sjtu.edu.cn
- Office Hours: By Appointment

TA Info

- LI Jie 李捷
- Email: leslie0418@sjtu.edu.cn
- Office Hours: By Appointment

Course Website

- https://shenhaihui.github.io/teaching/mem6810f

Time & Venue

- Time: Wednesday 18:00–20:20, Week 1–16
- Venue: Middle Hall 301

Prerequisites

Undergraduate level courses of probability and statistics are assumed. (For those who are not familiar with these contents, supplementary reading will be provided when necessary.) Workable knowledge in linear algebra and calculus is also needed. Programming knowledge will be beneficial, but is not required.

Course Materials

- Lecture Notes
- Online Materials
- Supplementary Reading Materials

Tentative Outline

- Introduction to Simulation
- Elements of Probability and Statistics
- Queueing Models
- Random Variate Generation
- Input Modeling
- Verification and Validation of Simulation Models
- Output Analysis I: Single Model
- Simulation in Excel and FlexSim
- Output Analysis II: Comparison
- Output Analysis III: Optimization

Main References

- Banks, Carson II, Nelson, and Nicol (2010). *Discrete-Event System Simulation.* Pearson, 5th Edition.
- Averill M. Law (2015). *Simulation Modeling and Analysis.* McGraw-Hill, 5th Edition.
- 肖田元, 范文慧 (译) (2007), Banks 等 (著). 离散事件系统仿真 (原书第 4 版). 机械工业出版社.

Course Evaluation

- Homework (may include in-class test) ····· (40%)
- Final Exam (paper & pencil test)····· (60%)

Class Policy

- Regular and punctual attendance is required.
- A repeatedly disruptive student will have his or her grade reduced. Side conversations during lectures are to be kept to a minimum. However, asking/answering questions and making comments are *always welcomed* and *highly encouraged*.
- **Academic Honesty**: Plagiarism of homework and cheating in exam are both serious fraud, which will be SEVERELY PUNISHED (ranges from point deduction, course failure, to disciplinary sanction from the university). In plagiarism cases, BOTH the giver and the copier will be treated as guilty. It's OK to discuss with others when doing homework, but you have to write the solution BY YOURSELF.