SIE 431/531
Simulation Modeling and Analysis
Spring 2018

Class hours: MWF 10:00 – 10:50 a.m., Lecture: S212 AME

Course URL: http://www.d2l.arizona.edu (where you need to login with Arizona account)

Instructor: Dr. Young Jun Son
111 Engineering Building #20, Tel: 626-9530, Email: son@sie.arizona.edu
Office hours: MW 2:00 – 3:30 p.m., or by appointment (e-mail)

Teaching Assistant: Saurabh Jain
Location: 258 Engineering Building #20, Tel: 626-1179, Email: saurabhjain@email.arizona.edu
TA office hours: 10:30 a.m. – 11:45 a.m. on Tuesdays and 3:15 p.m. – 4:30 p.m. on Thursdays

Purpose: This course is designed to develop student's ability to *model* and *analyze* real *systems* using *discrete event simulation*. Through this course, the student will understand the power and characteristics of discrete event simulation modeling. During the course, the student will get experience in: (1) formulating an appropriate simulation model for a system, (2) implementing the model as a computer program, and (3) evaluating the output of the model. Interoperability issues of simulation with other applications, including database, will also be covered.

Text: *Simulation with Arena*, W. David Kelton, et al, 6th edition, McGraw-Hill, 2014, ISBN 9780073401317.

Reference: *Simulation Modeling and Analysis*, Law and Kelton, Third Edition, McGraw Hill, Boston, MA, 2000, ISBN 0-07-059292-6.

Arena Software: 1) A link to the installation file for your laptop is shown below (the link is also available in D2L), and 2) SIE computer labs (both undergraduate and graduate computer labs) have computers with Arena 14.5.

- Link to Arena installation file:
  http://highered.mheducation.com/sites/0073401315/student_view0/arena_software_download.html (~788MB)

- Instruction and note on installation: On the above website, you may click "download" link and download the software. Run "autorun.exe" file found in the MediaImage folder to launch the software after extracting the zip file and type in "STUDENT" when it requires activation serial number during installation. The remaining installation process is straightforward. Arena 14 works with Windows XP, Vista and 7. Windows 8 was released after Arena 14, is therefore not officially supported. But, you can install Arena using compatibility mode in Windows 8, 8.1, and Windows 10 (Instruction containing snapshots is available in D2L).
  Caution: Arena does not support macOS (OS X). In order to run Arena, you need to install Windows 8 (,8.1, or 10) on your mac first.

Lecture Notes: Lecture notes will be uploaded early in the morning (at latest) of the class date. Therefore, students are required to visit the course web site and print out new handouts before they come to the class.

Topics to be covered:
1. Introduction (definitions and types of simulations)
2. Mechanism of discrete event simulation
3. Random number/variate generation
4. Input data analysis (input distribution modeling)
5. Simulation modeling using Arena package
6. Review of probability and statistics
7. Simulation output analysis
8. Monte Carlo simulation
9. Modeling continuous processes
10. Verification and validation of simulation models
11. Read/write simulation data from/to external files

Work Required:
1. Exams: There will be a midterm and a final examination.
2. Homework: Homework will be assigned on a regular basis.
3. Final project: Final project will be performed as groups. Undergraduate students will be given a same problem for their projects whereas graduate students will select their topics in consultation with me. Further information on the project will be provided in a separate handout in the middle of the semester.

Grading:
1. Homework: 20 %
2. Midterm Exam: 30 % (TBA)
3. Quizzes: 5 %
4. Final Exam: 30 %, 10:30~12:30 at classroom on May 4, 2018
5. Project: 15 %

Computer Usage:
1. Arena Simulation Package (major)
2. VBA in Arena (minor)

Course Rules:
1. Homeworks need to be done individually unless otherwise mentioned.
2. Students are expected to attend lectures. The instructor reserves the right to give a pop quiz at any time. You should expect such a quiz on any day where less that 50% of the registered students are not in class at the designated start time.
3. You can miss one quiz without affecting your grade. However, no make up quizzes or assignments will be given under any circumstances (except the situation mentioned in the item 4 below).
4. All holidays or special events observed by organized religions will be honored for those students

who show affiliation with that particular religion; Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored.

5. Students are not allowed to use pagers and cell phones during the class.

6. Plagiarism is not allowed to any extent for the assignments, exams, and final projects.

7. Threatening behavior by students is prohibited (refer to the University policy at http://policy.web.arizona.edu/~policy/threaten.shtml).

8. Students with Disabilities: If you anticipate the need for reasonable accommodations to meet the requirements of this course, you must register with the Disability Resource Center and request that the DRC send me official notification of your accommodation needs as soon as possible. Please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

9. The information contained in the syllabus (except the grade and absence policies) may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

Inclusive Excellence:
Inclusive Excellence is a fundamental part of the University of Arizona's strategic plan and culture. As part of this initiative, the institution embraces and practices diversity and inclusiveness. These values are expected, respected and welcomed in this course.

This course supports elective gender pronoun use and self-identification; rosters indicating such choices will be updated throughout the semester, upon student request. As the course includes group work and in-class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect.