SIE 431/531
Simulation Modeling and Analysis
(FIVE WEEK – SECOND: 7/10 – 8/9)

Teaching modality: Flipped (time to meet: TBD, see the announcement under D2L or via email)
Office hours: by appointment

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Wed 7pm-9pm
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OBJECTIVES
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. (prerequisite: **SIE 305**- Introduction to Engineering Probability and Statistics).

LEARNING OUTCOMES
Upon completion of the course SIE 431 students will be able to demonstrate the following Learning Outcomes:
- formulating a given problem or a system into an appropriate simulation model,
- implementing the model as a computer program, and
- evaluating the output of the model.

Upon completion of the course SIE 531 students will be able to demonstrate the following Learning Outcomes:
- formulating a real-world or a research problem into an appropriate simulation model,
- implementing the model as a computer program, and
- evaluating the output of the model.

TOPICS COVERED
1. Basic concepts of simulation (definitions and types of simulations)
2. Mechanism of discrete event simulation
3. Random number generation
4. Input data analysis (input distribution modeling)
5. Simulation modeling using Arena package
6. Simulation output analysis
7. Monte Carlo simulation
8. Verification and validation of simulation models
9. Other simulation approaches (Time driven simulations).

Textbook: (required) *Simulation with Arena*, W. David Kelton, et al, 6th edition, McGraw-Hill, Boston, MA, 2014
Site for the Course Material: Book examples and Arena software can be downloaded from https://highered.mheducation.com/sites/0073401315/student_view0/arena_software_download.html

GRADING SCHEME

1. Quizzes: 25%
2. Homework: 30% (homework policy will be announced on D2L)
3. Final Exam 45%

HOMEWORK POLICY

1) Homework will be assigned on a regular basis.
2) All assignments need to be submitted to D2L Dropbox.
3) Each homework set counts 10 points. A maximum of 6 points will be given for late homework. Late submission will not be accepted after the solution is discussed in the lecture.
4) For all homework that involves ARENA models, please submit: a) the .doe file; and b) a brief summary (less than a page) of the result, including a screenshot of the ARENA model. Please do not submit the output report generated by ARENA towards the end of the simulation.
5) For homework problems with hand calculation, please show all the intermediate result.