Course title and number: ISEN 355 System Simulation

Term (e.g., Fall 200X): Fall 2016

Meeting times and location: TBD

**Course Description and Prerequisites**

Systems simulation structure, logic and methodologies; development of simulation models; data handling methods; analysis of simulation data; verification and validation; system simulation languages, models and analysis; applications to industrial situations.

Prerequisites: ISEN 230 and ISEN 310.

**Learning Outcomes**

Students are able to

- develop models using commercially available discrete event (process-oriented) simulation software,
- interpret simulation output using valid statistical methods,
- collect and analyze input data using valid statistical methods, and
- apply simulation to model industrial and system engineering problems.

**Instructor Information**

Name: TBD
Telephone number: TBD
Email address: TBD@tamu.edu
Office hours: TBD
Office location: TBD

**Textbook and/or Resource Material**


Reference:
Grading Policies

Lab Assignments 12%, Quizzes 8%, Two in-class exams 20% (10% each), Two lab exams 40% (20% each), and final exam 20%. Homework will be assigned but not collected or graded. Quizzes will be given in class based on the topics covered in class and homework assignment.

Grades assigned are A for 90%–100%, B for 80%–89.9%, C for 70%–79.9%, D for 60%–69.9% and F for less than 60%.

Attendance and Make-up Policies

Class attendance is not optional. You are expected to attend all class lectures and labs except for university excused absences. With an excused absence, it is still the student's responsibility to find out the homework assignment and be ready for a quiz. Make-up for the exams and quizzes will be offered only in case of a university excused absence. The university rule regarding excused absences can be found at http://student-rules.tamu.edu/rule07. Because we often begin class or labs with computer work, it is also important that you arrive on time. Students arriving to lab after the initial lab lecture has started will receive a two point deduction for that day's lab assignment.

Quizzes, Homework, and Lab: At any time, without warning, a short quiz based on the homework or in-class examples might be given. Quizzes are 5-10 points and labs are 10 points, although some of the more complex lab assignments may be may be split into an in-class portion and a take-home portion. Simulation code developed as part of the lab assignment should be submitted online using http://ecampus.tamu.edu. Take-home lab assignments will always be due by 5:00 PM on the Friday following the lab, and should be submitted online using http://ecampus.tamu.edu. Late assignments are not accepted except for university excused absences. Quizzes will be given at the start of class so it is important not to be late since late arrivals will receive zero for that day's quiz.

Course Topics, Calendar of Activities, Major Assignment Dates

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Required Reading</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction to the course, introduction to simulation, and relationship with probability and statistics. Lab 1: Introduction to Simio.</td>
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<td>2</td>
<td>Relationship with queueing system. Simio concepts in class and lab. Lab 2: Branching and looping logic using Simio.</td>
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<td>3</td>
<td>Random Number Generation, Random Variates, importance of seed. Lab 3: Debugging tools in Simio.</td>
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Output analysis using statistical methods, confidence intervals. Simio concepts in class and lab.
Lab 4: Interpreting results from Simio output.

Terminating systems and non-terminating systems. Simio concepts in class and lab. First Test (in class).
Lab 5: Experiments using Simio and generating confidence intervals on estimates.

System comparison. Simio concepts in class and lab.
Lab 6: Comparing systems using Simio; interpreting outputs


Input data analysis. Data handling methods, statistical goodness of fit tests.
Lab 7: Introduction to Processes.

Distribution fitting and parameter estimation using statistical methods.
Lab 8: Use of Tally statistics

Verification and Validation.
Lab 9: Use of State and Output statistics.

Supply chain and logistics modeling and analysis using simulation.
Lab 10: modeling and analysis of a supply chain problem using Simio

Manufacturing and service system modeling and analysis using simulation.
Lab 11: modeling and analysis of a manufacturing system using Simio.

Agent Based Simulation, Monte Carlo Simulation; Third Test (in class)
Lab 12: Advanced uses of Processes in Simio.

Simio examples. Fourth Test (in lab)

Final exam during week of finals
Other Pertinent Course Information

Software: We will be using Simio as the simulation software, and Arena's Input Analyzer and @RISK Excel add-in for input data analysis. The software is available on the departmental cloud server (https://isenstorefront.ie.tamu.edu) and also in the computers in the lab and classrooms. You will need to have a VPN connection in order to access the departmental cloud server. More details on installing the VPN can be found at http://hdc.tamu.edu/Connecting/VPN/index.php. Information on obtaining an optional personal copy of Simio will be made available on eCampus.

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity

For additional information please visit: http://aggiehonor.tamu.edu

“An Aggie does not lie, cheat, or steal, or tolerate those who do.”

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning and to follow the philosophy and rules of the Honor System. Ignorance of the rules does not exclude any member of the Texas A&M University community from the requirements or the processes of the Honor System. For additional information please visit: http://student-rules.tamu.edu/; http://student-rules.tamu.edu/aggiecode; and http://student-rules.tamu.edu/rule20. The complete information of university regulations regarding the handling of academic misconducts (including the appeal process) can be found at http://aggiehonor.tamu.edu/.

I, <insert instructor name>, as the rest of the Industrial & Systems Engineering Faculty, uphold the Aggie Honor Code as an axiom of our academic excellence. We consider its sincere observance to be essential for membership in our department and Texas A&M. We extend you the trust conferred to those who faithfully adhere to our honor code. Abuse of this trust is intolerable, thus I will report and assign an extreme penalty to those who do not stand with us in preserving the integrity symbolized by the Aggie Honor Code, “An Aggie does not lie, cheat, or steal or tolerate those who do.”

In this course the penalty for any violation of the Aggie Honor Code, as minimal as it may be, is F*. 