IE 4420: System Simulation  
Course Syllabus - Winter 2019

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Time & Location: Monday & Wednesday 5:30 – 6:45 pm, Room 2060, MANU, 4815 Fourth Street.

Office Hours: Monday 4:20-5:20 pm, Or by appointment, Room 2060, MANU, 4815 Fourth Street.

Web Sites: http://canvas.wayne.edu

Description: The goal of this course is to develop students into competent simulation analysts who are capable of using process simulation to enhance organizational performance in an increasingly complex, turbulent and uncertain business environment. The course uses discrete-event simulation as a tool to model the behavior of industrial systems for process analysis and process improvement. Material to be taught includes basic analysis methods for dynamic systems and the statistical concepts required for simulation modeling and interpretation of results. The course will cover both simulation concept/theory and simulation software of ARENA. It will teach hands-on simulation material includes basic and intermediate modeling concepts of the ARENA simulation language.

Course Learning Outcomes: This course is designed to help you learn and develop as a professional. Students who have participated well in this class and mastered the material are expected to:

- Identify appropriate applications of computer simulation to business and industrial problems
- Build basic simulation models in ARENA
- Collect and analyze simulation input data
- Draw appropriate conclusions from simulation analysis
- Perform simulation analyses and develop management reports

Students will also be exposed to simulation software ARENA and best business practices via homework assignments and course projects.

Prerequisites:
- Basics of probability and statistics
- Basic knowledge of computer programming

Textbook and References:

Software: Simulation software ARENA

Grading:
- Homework 20%
- Semester Project 40%
- Final Exam 40%

Homework Policy: All homework are collected at the beginning of class on due dates. The solution of computer based homework needs to be submitted through Canvas. Students need to follow the instruction of each homework. No late homework is acceptable, but the lowest HW grade is not counted in the final grade.

Exams: Exams will focus on the material taught in class. They will be open-book, open-note. Makeup exams must be requested in writing and must be the direct results of a medical or work-related issues.
Semester Project: During the semester, a course project is required by applying the statistical methods to solve an interesting real-world big data problem. Detailed guideline of the project will be given during the semester. The project will be graded as follows:

- Proposal 5%
- Presentation 45%
- Final Project Report 50%

Attendance Policy: Students attending any given class are required to join the class within the first five minutes to minimize any class disruptions.

Religious Holidays: Because of the extraordinary variety of religious affiliations of the University student body and staff, the Academic Calendar makes no provisions for religious holidays. However, it is University policy to respect the faith and religious obligations of the individual. Students with classes or examinations that conflict with their religious observances are expected to notify their instructors well in advance so that mutually agreeable alternatives may be worked out.

Student Services:
- The Academic Success Center (1600 Undergraduate Library) assists students with content in select courses and in strengthening study skills. Visit http://success.wayne.edu for schedules and information on study skills workshops, tutoring and supplemental instruction (primarily in 1000 and 2000 level courses).
- The Writing Center is located on the 2nd floor of the Undergraduate Library and provides individual tutoring consultations free of charge. Visit http://clasweb.clas.wayne.edu/writing to obtain information on tutors, appointments, and the type of help they can provide.

Class Recordings:
Students need prior written permission from the instructor before recording any portion of this class. If permission is granted, the audio and/or video recording is to be used only for the student’s personal instructional use. Such recordings are not intended for a wider public audience, such as postings to the internet or sharing with others. Students registered with Student Disabilities Services (SDS) who wish to record class materials must present their specific accommodation to the instructor, who will subsequently comply with the request unless there is some specific reason why s/he cannot, such as discussion of confidential or protected information.

Academic Dishonesty – Plagiarism and Cheating:
Academic misbehavior means any activity that tends to compromise the academic integrity of the institution or subvert the education process. All forms of academic misbehavior are prohibited at Wayne State University, as outlined in the Student Code of Conduct (http://www.doso.wayne.edu/student-conduct-services.html). Students who commit or assist in committing dishonest acts subject to downgrading (to a failing grade for the test, paper, or other course-related activity in question, or for the entire course) and/or additional sanctions as described in the Student Code of Conduct.

- Cheating: Intentionally using or attempting to use, or intentionally providing or attempting to provide, unauthorized materials, information or assistance in any academic exercise. Examples include: (a) copying from another student’s test paper; (b) allowing another student to copy from a test paper; (c) using unauthorized material such as a “cheat sheet” during an exam.
- Fabrication: Intentional and unauthorized falsification of any information or citation. Examples include: (a) citation of information not taken from the source indicated; (b) listing sources in a bibliography not used in a research paper.
- Plagiarism: To take and use another’s words or ideas as one’s own. Examples include: (a) failure to use appropriate referencing when using the words or ideas of other persons; (b) altering the language, paraphrasing, omitting, rearranging, or forming new combinations of words in an attempt to make the thoughts of another appear as your own.
- Other forms of academic misbehavior include, but are not limited to: (a) unauthorized use of resources, or any attempt to limit another student’s access to educational resources, or any attempt to alter equipment so as to lead to an incorrect answer for subsequent users; (b) enlisting the assistance of a substitute in the taking of examinations; (c) violating course rules as defined in the course syllabus or other written information provided to the student; (d) selling, buying or stealing all or part of an un-administered test or answers to the test; (e) changing or altering a grade on a test or other academic grade records.

Student Disability Services: If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. The SDS telephone number is 313-577-1851 or 313-202-4216 for...
videophone use. Once you have met with your disability specialist, I will be glad to meet with you privately during my office hours to discuss your accommodations. Student Disability Services’ mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University. You can learn more about the disability office at [http://studentdisability.wayne.edu/](http://studentdisability.wayne.edu/).

Students who are registered with Student Disability Services and who are eligible for alternate testing accommodations such as extended test time and/or a distraction-reduced environment should present the required test permit to the professor at least one week in advance of the exam. Federal law requires that a student registered with SDS is entitled to the reasonable accommodations specified in the student's accommodation letter, which might include allowing the student to take the final exam on a day different than the rest of the class.

**Course Drops and Withdrawals:** In the first two weeks of the (full) term, students can drop this class and receive 100% tuition and course fee cancellation. After the end of the second week there is no tuition or fee cancellation. Students who wish to withdraw from the class can initiate a withdrawal request on Pipeline. You will receive a transcript notation of WP (passing), WF (failing), or WN (no graded work) at the time of withdrawal. No withdrawals can be initiated after the end of the tenth week. Students enrolled in the 10th week and beyond will receive a grade. Because withdrawing from courses may have negative academic and financial consequences, students considering course withdrawal should make sure they fully understand all the consequences before taking this step. More information on this can be found at: [http://reg.wayne.edu/pdf-policies/students.pdf](http://reg.wayne.edu/pdf-policies/students.pdf).

**Deferred Grade:** A grade of 'I' can only be assigned if all of the following criteria are met:
1. the student IS NOT currently failing the class and,
2. there is NOT a substantial quantity of work yet to be completed,
3. there is no extra work required of the instructor beyond the normal duties of grading the paper/exam,
4. there is no need for the student to attend the class in subsequent terms.

The final decision to assign an incomplete grade rests with the instructor. An 'I' grade MUST be made up within one year of assignment of the grade.

**Course Modules:**
- Introduction to Simulation
- Fundamental Simulation concepts
- ARENA Modeling concepts
- Input Data Analysis
- Post Simulation Analysis

**Grading Scale:** The grade of homework assignment, exam, and project might be curved. The final grade will be assigned according to the following numeric scores obtained from homework assignments, final exam, and the course project report/presentation:

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<th>Course Points (0-100)</th>
<th>Course Grade</th>
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<tr>
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<td>A</td>
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<tr>
<td>86 – 90</td>
<td>A-</td>
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<tr>
<td>81 – 85</td>
<td>B+</td>
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