MEMORANDUM

Winter Semester 2018

To: ISE 4469 /5469 Students and SECS Faculty

From: Sankar Sengupta, Professor ISE Department.
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Office Hours: M and W 5:30 P.M.-6:30 P.M. or by appointment.

SUBJECT: Course Outline and Operating Procedure for ISE 4469/5469- Computer Simulation in Engineering

Text: **Discrete Event Simulation: Theory and Application** by Sankar Sengupta,. ISE Department. Oakland University, Rochester, MI

Recommended Reading:

1. Simulation Modeling and Analysis, by Averill M. Law and W. David Kelton, A McGraw- Hill Publication.
2. Handbook of Simulation, Principles, Methodology, Advances, Applications and Practice, edited by Jerry Banks, A John Wiley publication.

COURSE OBJECTIVES: On successful completion of this course a student should be able to do the Following:

- Recognize the strengths and the weaknesses of discrete event stochastic simulation Models (a,e),
- Select simulation as modeling tool for a real world problem (e),
- List and carry out the steps of a simulation study (e),
- Carry out optimization based on a simulation model (a,k),
- Be familiar with at least one commercially available simulation software (k).

Tentative Course Outline:

1. Fundamentals of simulation as a modeling tool,
2. Modeling Input data,
3. Generation of U (0,1) random numbers,
4. Generation of random variates,
5. Verification and validation of models,
6. Output Analyses,
7. Introduction to Queuing Theory,
8. Discussion of real world applications,
9. Optimization based on simulation,
10. Agent Based Simulation.

HOMEWORK: Homework will be assigned, graded and discussed in class. No homework will be accepted late without prior permission of the instructor. Late homework will carry a penalty to be decided by the instructor. The course grade will be decided based on the following weighting factors: mid-term 25%, final test 30% , homework 20% and a class project 25%. Students are encouraged to bring real world problems and discuss them in class. The mid-term may be assigned as a take home test.

ATTENDANCE POLICY: None, but it is expected that a student will attend every class held during the Semester. A poor attendance usually leads to poor performance in the course.

ACADEMIC CONDUCT: Unless specified otherwise, each student must submit individual unaided work With documentation of sources used.

A description of each program outcome is included next in the handout. This will help the students to understand how the course objectives relate to the program outcomes.

The list of ABET Program Outcomes (a through k)

(a) an ability to apply knowledge of mathematics, science and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health, safety, manufactured ability, sustainability
(d) an ability to function on multi-disciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economical, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills and modern engineering tools necessary for engineering practice.