COURSE SYLLABUS
IE 406/408: Simulation
Spring 2019

THE UNIVERSITY OF TENNESSEE KNOXVILLE

Meeting Time :	**Tue./Thu. 11:10AM - 12:25 PM**
Location :	**402 John D. Tickle Engineering Building**
Course Credit Hours:	**3.0 Credits**

INSTRUCTOR CONTACT INFORMATION:

Instructor:	Xueping Li
Office hours:	TTH 10:00 AM - 11:00 AM (open door policy)
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I. **COURSE DESCRIPTION:** This course covers topics in modeling and simulation with applications to all areas of **business** and **industry** where management, strategic and operational decision making can be enhanced through the analysis, modeling, simulation, and optimization of complex systems. Particular attention is given to *Supply Chain Logistics and Healthcare Systems*.

This course focuses on the construction of simulation models of real or conceptual systems using the simulation software package **AnyLogic** while covering the analytical aspects of utilization of simulation models and optimization techniques. Both discrete event models and agent-based models will be covered.

(RE) Prerequisite(s): IE200 or Statistics 251.
(RE) Corequisite(s): IE310.

II. **VALUE PROPOSITION:** Simulation is a powerful tool to analyze complex, dynamic and stochastic systems. Ability to design, analyze, and interpret simulation models for such systems is crucial in making efficient business and engineering decisions. This course will address the topics that are essential for developing these skills.

III. **STUDENT LEARNING OUTCOMES:** On completion of this course students will be able to correctly design, analyze and interpret the results of computer simulation experiments using simulation software package. Specifically, they will:

- In general, be able to build simulation models using a computer;
- Understand the assumptions, strengths and weaknesses of simulation models;
- Analyze and translate problems into a form suitable for applying simulation strategies; and
- Validate simulation models and optimize the system.

IV. **LEARNING ENVIRONMENT:**

Students Responsibility	Instructors Responsibility
Be prepared for all classes	Be prepared for all classes
Be respectful of others	Be respectful of the students
Actively contribute to the learning activities in class	Create and facilitate meaningful learning activities
Abide by the UT Honor Code	Evaluate all fairly and equally

V. **TEXTBOOK (OPTIONAL) & REFERENCES:**

AnyLogic 7 in Three Days. Ilya Grigoryev. ISBN-10: 150893374X.
The Big Book of Simulation Modeling. Andrei Borshchev. ISBN-13: 978-0989573177.

AnyLogic web site http://www.anylogic.com
Winter Simulation Conference http://www.wintersim.org

Software: AnyLogic v8.
RESERVED MATERIALS will be made available at the library or course companion web sites as our course develops.

VI. **TECHNOLOGICAL RESOURCES:**

All homework assignments and lecture slides will be posted on the course Canvas/Blackboard Site or shared Google Drive folder.

VII. **COURSE REQUIREMENTS, ASSESSMENT AND EVALUATION METHODS:**

(a) Students are responsible for announcements and material covered in class.

(b) **Homework and Quizzes.** Homework problems will be assigned based on the covered material. Quizzes will be pop quizzes. Assignments are due at the beginning of the class. No late work is accepted. Assignments are individual efforts based unless advised otherwise.

(c) **Exams.** No written exams! Instead, you will be working on a team-based term project (rubrics will be given). Mini projects may be given as a take-home exam or a quiz.

(d) **Attendance** is not mandatory, however it is **extremely important** to succeed in this course.

(e) **Extra credit.** Each student may receive up to 3 extra credit points towards their final grade during the lecture activities (i.e., pop-quiz, grade lottery). **No extra credit** will be given for any additional work or redoing assignments.

(f) **Grading** will be based on homework assignments (30%), quizzes (30%), and term projects (40%).

(g) **Grading scale**

		A	100-91	A-	91-89
B+	89-86	B	86-82	B–	82-80
C+	80-77	C	77-72	C–	72-70
D+	70-67	D	67-62	D–	52-60
F	59-0				

(h) **When taking a quiz or homework assignment, cheating in any form will result in a grade of 0 for that exam.**

VIII. **HOW TO BE SUCCESSFUL IN THIS CLASS:** To maximize your success in this class:

- Invest some time and do your own work
- Attend every class
- Take notes and go over them before the next class
- Practice, practice, practice!
- Attend office hours for extra help
- Ask questions during and after the class
- Discuss with each other

IX. **STUDENTS WITH DISABILITIES POLICY:** Please refer to campus policy.

X. **THE INSTRUCTOR RESERVES THE RIGHT TO REVISE, ALTER AND/OR AMEND THIS SYLLABUS, AS NECESSARY. STUDENTS WILL BE NOTIFIED IN WRITING AND/OR BY EMAIL OF ANY SUCH REVISIONS, ALTERATIONS AND/OR AMENDMENTS.**

XI. **COURSE OUTLINE/ASSIGNMENT/UNITS OF INSTRUCTION OR CLINIC SCHEDULE:**

The following is a very tentative schedule for the course - we will probably change things as we proceed depending upon the progress we are able to make.

Lecture Topics	Time
- Introduction to simulation & demos	1/2wk
- Fundamental simulation concepts (HW#1)	1/2wk
- Concepts & simulation by-hand	1wk
- Random Number Generation (Quiz#1, HW#2)	1/2wk
- A guided tour to AnyLogic (M/M/1 model: TIS using TimeMeasure module, Histogram, View etc.)	1-2 wks
- AWTQ, WIP, Plots, collect statistics, animation, etc. (HW#3)	
- Modeling basic operations and inputs (Enterprise process models, Case Study PP/SP) (HW#4, Quiz#2)	2-3wks
- Modeling detailed operations (Schedules, Network, Variables, 3D animation, etc.) (#Quiz/mini-project)	2-3 wks
- Statistical output analysis	1wk
- OptQuest for optimization and replications (#mini-project)	1wk
- Advanced topics and case studies	1-2 wks
- Term project presentation and demonstrations	1-2wks