

LSCM 4900.702 Syllabus
Complex Logistics Systems Modeling & Simulation

Instructor: Dr. Brian Sauser
E-Mail: brian.sauser@unt.edu
Phone - Office: (940) 565-4693
Office Hours: by appointment
Class Hours: Tuesday 1:00-4:00
Class Location: BLB 277, Complex Logistics Systems Laboratory

1. Course Description

This course introduces decision modeling and simulation approaches for logistics and supply chain management. Modeling includes the physical, mathematical or otherwise logical representation of a system, entity, phenomenon or process, and simulation is a method for implementing a model over time in an effort to design, test, or analyze a “real-world” system. Modeling tools will be used with a focus on a general purpose and a specialization with specific software tools (i.e. SIMIO). Along with individual assignments, students will work in groups partnered with industry to build a simulation that addresses a “real-world” problem.

2. Course Objective

To gain experience on applying modern simulation technology for problem solving in business and industry.

3. Required Text

Reading and classroom materials will be provided in class or through multi-media formats.

4. Core Curriculum

This course was designed to bridge the STEM (science, technology, engineering, mathematics) and Business core courses (accounting, finance, management, information systems, and marketing) covered in the Logistics Program. As an integral part of this course the student will develop and demonstrate the core objectives of Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills, and Teamwork Skills:

- **Critical Thinking Skills** – to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
- **Communication Skills** – to include effective development, interpretation and expression of ideas through written, oral and visual communication.
- **Empirical and Quantitative Skills** – to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.
- **Teamwork Skills** – to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

5. Course Schedule

Wk	Lecture Topic	Assignment/Due Date
1	Course Introduction/What is Modeling and Simulation	
2	Process Modeling and Basics of Queing Theory	
3	Approaches to Simulation	
4	Input Analysis	
5	Introduction to Course Project and Project Planning	
6	Simulaton Modeling with SIMIO: Part 1	Project Plan
7	Simulaton Modeling with SIMIO: Part 2	Simulation Modeling with SIMIO-1
8	Simulaton Modeling with SIMIO: Part 3	
9	Mid-Term Project Review	Mid-Term Project Review
10	Simulaton Modeling with SIMIO: Part 4	Simulation Modeling with SIMIO-2
11	Simulaton Modeling with SIMIO: Part 5	
12	Simulaton Modeling with SIMIO: Part 6	Simulation Modeling with SIMIO-3
13	Preliminary Final Project Review	
14	Presentation of Final Project	Project, Presentation, and Simulation

6. Class Deliverables

Homework Assignments	50%
<ul style="list-style-type: none"> • Project Plan (group) • Mid-Term Project Review (group) • Simulation Modeling with SIMIO-1 (1-2 students) • Simulation Modeling with SIMIO-2 (1-2 students) • Simulation Modeling with SIMIO-3 (1-2 students) 	
Group Project (Paper, Presentation & Simulation)	50%

6.1. Project Plan

The principal purpose of the *Project Plan* is to define the group project and describe the basis for its management. The following questions should be able to be answered by reading the *Project Plan*:

- a) What is the project aiming to achieve and why is the project important?
- b) What will the project produce?
- c) How will you know you are done?
- d) What are your key assumptions?
- e) Who will be involved with the project and what are their roles and responsibilities?
- f) What will the project require from others (resources, information, etc.)?
- g) What is the planned schedule?
- h) What are the top risks?

At a minimum, the *Project Plan* should contain the following:

- [1] Project Description
- [2] Project Background
[List any previous reports, documentation etc. that might impact the project.]
- [3] Project Objectives
- [4] Project Deliverables
- [5] Validation Criteria

[How will you know you have delivered an acceptable set of products?]

- [6] Assumptions
- [7] Project Roles and Responsibilities Matrix
- [8] Resource Requirements and Constraints
- [9] Initial Schedule
 - [Gantt Chart of top-level milestones]*
- [10] Initial Risk Identification and Mitigation Log
- [11] How will the group make decisions
- [12] How will the group communicate
- [13] How will the group treat one another
- [14] How will the group do business as a project group

What is due:

- i) Presentation: At least one group member will give an oral presentation, which represents the group's collective to their *Project Plan* (max. 10 minutes)
- ii) *Project Plan*: A written document signed by all group members, which represents the group's collective response as listed above. This document should be signed by all group members indicating their collective agreement to what is specified in the document.

6.2. Mid-Term Project Review

The *Mid-Term Project Review* concentrates on progress towards the goals of the specific modeling and simulation project. Review meetings are a chance to reflect on "how are we doing?" Overall project goals and objectives, plus specific 'milestones' that were agreed from the outset of the project.

During the *Mid-Term Project Review*, the groups should address the following questions:

- a) What has been achieved?
- b) What evidence and outputs can you show/describe?
- c) How has this been achieved?
- d) What's gone well? What's gone not so well?
- e) What to do differently in future? Ideas?
- f) What you've learnt from both successes, and challenges, so far?
- g) Given what you've learnt, what future actions might you take?

What is due:

- i) Presentation: At least one group member will give an oral presentation, which represents the group's collective response to the *Mid-Term Project Review* as listed above (max. 10 minutes)
- ii) Updated Project Plan: A written document signed by all group members, which represents the group's collective response to the *Mid-Term Project Review* as listed above and how this compares to the original *Project Plan*. This document should be signed by all group members indicating their collective agreement to what is specified in the document.

6.3. Modeling and Simulation with SIMIO 1-3

SIMIO homework assignments have a three-fold purpose: (1) to practice modeling problems to solving real-world examples; (2) to learn how to develop simulation models in SIMIO, and (3) to learn how to adapt simulation models for industrial applications. As such, the assignments are designed to help learn beyond what is covered in the classroom.

Multiple homework assignments are given during the semester and will be made available on the course website (via Blackboard). Students can work individually or in pairs turning in only one assignment with a max of two names.

6.4. Group Project – Paper, Presentation, and Simulation

Students will be assigned into groups of 2-3 students for one or more topic areas (total number of groups determined by class size). Each group will be partnered with a company that will define an industry problem that can be addressed with a modeling and simulation method. The groups will then work through the semester developing a project plan, design solution, model and simulation, and supporting analysis and report.

This course is designed to allow undergraduate students the opportunity to pursue a project that includes the use of modeling and simulation for logistics systems to better address a problem that contributes to their professional development. The project is graded based on performance at an appropriate level. The selection of an appropriate project, the project final report, and presentation will be discussed further in class. The project is an ongoing part of the class and you will be required to make progress reports in class. Students will be assigned a topic based on an industry customer. The purpose of this project is to (1) allow the student to immerse themselves into a particular area of logistic thought and study; and (2) provide the student with experience in preparing and executing a modeling and simulation study.

The project grade is based on the students’ ongoing class participation as well as final presentation, report, and simulation. While presentation and writing styles differ from student to student, appropriate grammar, style, etc. are expected both in presentations and in all written material. The projects will require significant work outside the classroom. This is in addition to the time spent on class preparation.

7. Grading Rubric/Scale

Assignments will be graded using the University of North Texas assessment rubrics in compliance with the Texas Higher Education Coordinating Board. These rubrics will be uploaded into Blackboard and grades and feedback will be distributed via Blackboard. See table below for reference to what rubrics and point values will be used with each assignment.

Assignment	Rubric	Pts
Project Plan	Communications/Critical Thinking	10
Mid-Term Project Review	Communications/Critical Thinking	10
Simulation Modeling with SIMIO-1	Empirical & Quantitative Skills	10
Simulation Modeling with SIMIO-2	Empirical & Quantitative Skills	10
Simulation Modeling with SIMIO-3	Empirical & Quantitative Skills	10
Group Project		50
Report	Communications/Critical Thinking	15
Presentation	Communications	10
Simulation	Empirical & Quantitative Skills	15
Teamwork	Teamwork	10
Total		100

Final grades will be awarded based on the following scale:

Grade	Numeric Range	Grade Point
A	90-100	4.0
B	80-89	3.0
C	70-79	2.0
D	60-69	1.0
F	≤59	0.0

8. Class Attendance

Each student is responsible for all material covered during class, including changes to the syllabus, course schedule, and course materials. Missed lecture material will not be supplemented. If a student must miss a class, they need to make the necessary arrangements to obtain any missed material or lecture notes from other students in the class. Class attendance is strongly encouraged because students will be called upon to answer questions, discuss assignments, and to comment on key concepts. Missing these opportunities may result in a reduction in your final grade. Class participation and attendance cannot be made up without prior approval from the instructor.

9. Extra Credit

There will be no extra credit in this class. Students will not be allowed to resubmit assignments.

10. Grading Appeals, Withdrawals and Incompletes

If a student disagrees with how any assignment is graded, they must submit a written appeal by email or letter before the start of the next class period. The email or letter must clearly state the rationale for the appeal and provide evidence to support your position. For example, a student may cite text references, PowerPoint slides, or outside readings to support their position—these must be clearly referenced by title and page number. The rationale should be objective in nature and should not include subjective opinions. Appeals that do not provide supporting rationale and specific reference(s) to course materials will be returned without consideration.

Please refer to the UNT Catalog for policies governing Withdrawals and Incompletes.

11. Cheating and Plagiarism

Cheating, plagiarism, or other inappropriate assistance on examinations, abstracts, or cases will be treated with zero tolerance and will result in a grade of “F” for the course. Any work should be solely the student’s effort with ABSOLUTELY NO outside help or assistance. Students must be familiar with and adhere to the University’s Academic Integrity policies. A dedicated website for this information can be found at: <http://vpaa.unt.edu/academic-integrity.htm>

To steal and pass off (the ideas or words of another) as one's own is plagiarism. If a student quotes or references other’s material, they must cite the sources. Cutting and pasting from other sources, even if properly footnoted does not meet the criterion of submitting a student’s own work and will result in a failing grade for the course. According to University policy, if you become aware of any misconduct related to academic integrity, you should inform the instructor or another proper authority such as the Department Chair or Associate Dean.

12. American with Disabilities Act

The College of Business Administration complies with the Americans With Disabilities Act in making reasonable accommodations for qualified students with a disability. If a student has an established disability as defined in the Act and would like to request accommodation, please see the instructor as soon as possible. Please note: University policy requires that students notify their instructor within the first week of class when an accommodation will be needed.