LSCM 6051: System Theory and Experimentation
G. Brint Ryan College of Business
University of North Texas
Spring 2023

Instructor: Suman Niranjan
(Class Number # 12789)

Days: Every Thursday BLB 314 - Face-to-Face (F2F)
Time: 2pm to 4:40pm every Thursday.
First Meeting: Thursday 2pm (January 19th, 2021) Live F2F - BLB 314
Office: BLB 338B – Denton Campus;
Office Hours (F2F): Thursday 9am to 11am BLB 338B F2F and available via appointment.

Phone: 940.565.3673 (Denton)
Email: E-mail preferred through Canvas Email/Message, alternatively you can reach me via UNT e-mail: suman.niranjan@unt.edu

Canvas URL: https://canvas.unt.edu/

CATALOG DESCRIPTION

Provides an in-depth investigation and analysis of logistics and supply chain research based upon the systems view of the firm and the supply chain. Engineering, business and complex adaptive approaches to systems theory are explored as a framework for logistics and supply chain related business research. Systems theory is used to examine the efficacy of product and service dominant logics of exchange. To increase vibrancy and current research, faculty and industry experts in the area of systems theory and supply chain management will guest lecture and lead seminar discussions.

COURSE DESCRIPTION

LSCM 6051 provides an in depth synthesis of logistics research based upon the systems view of the firm and the supply chain. The course will investigate, analyze, and discuss the nature of logistics and the supply chain based upon a systems approach. Engineering, business and complex adaptive approaches to systems theory will be explored as a framework for logistics and supply chain research. The use of systems theory in the course will be learnt via the understanding of simulation and simulation optimization. Three types of simulation approaches will be learnt: discrete-event simulation, agent based simulation, system dynamic simulation. The class will research four important topics along with the learning of the simulation tool AnyLogic. The focus of four topics will be on multi-echelon supply chain/inventory optimization, field services management/optimization from a queuing theory perspective, distracted driving with a transportation psychology focus, peer-to-peer asset sharing from an operations perspective. The aforementioned four topics utilizes more than one standard methodological approach including simulation as one of the methodologies, the course will focus on a few methodologies within each topic. Students will be introduced to modeling and simulation approach to a systems problem. To increase vibrancy and currentness, research faculty and industry experts in the area of simulation optimization and supply chain management will guest lecture and lead seminar discussions.

COURSE OBJECTIVES

The basic objectives for this course are:

1. Explore simulation approaches-discrete event, system dynamic, and agent based
2. Examine and understand what simulation optimization means and how it can used for logistics and supply chain (LSCM) examples
3. Understand how to use AnyLogic and AnyLogistix simulation tools for solving LSCM problems.
4. Understand Multi-Echelon Supply Chain Optimization, Transportation Psychology, Field Services Optimization, Peer-To-Peer Asset Sharing, Emerging Technologies Applied To Supply Chain, and Reverse Logistics
5. Provide an opportunity for each student to develop a journal-quality paper and/or conduct dissertation research in the area systems theory for supply chain management
6. Understand the research, submission, review and publishing process

REQUIRED COURSE MATERIAL

Required Course Textbook: Borshchev, A. (2020). The big book of simulation modeling: multimethod modeling with AnyLogic 8. AnyLogic North America.
Some chapters are available for free on AnyLogic website:
https://www.anylogic.com/resources/books/big-book-of-simulation-modeling/
Majority of the chapters are from the 2013 edition of the same book, there is a kindle version of the book that can be purchased from Amazon.com: https://www.amazon.com/Big-Book-Simulation-Modeling-Multimethod-ebook/dp/B00YO0K1ZQ
We will utilize the new chapters that's available for free and the remining chapters will be from the 2013 edition of the same book.

Recommended Textbooks: ***The following textbooks are not required*** for this course but provide excellent references and further details for many of the simulation concepts presented in class. All the books can be found at this link: https://www.anylogic.com/resources/books/

- *AnyLogic in Three Days: Modeling and Simulation Textbook*
- *The Art of Process-Centric Modeling with AnyLogic*
- *Operations and Supply Chain Simulation with AnyLogic*

Class Readings: Each week you will have 6 to 10 readings, and these readings will be available on Canvas.

COURSE LECTURE MATERIALS

Canvas: Course materials, assignments, and outside readings will be available within Canvas. Students can access Canvas using the Internet and the site is password protected. You are expected to log in to Canvas at least once in every 24 hours. Important announcements are delivered to you via Canvas e-mail and announcements.

Outside Readings: Outside readings will be provided for class sessions as determined by the instructor. Topical issues will be provided from current business readings and sources. Students

will be required to find and publish readings through the Canvas course page.
Class PowerPoint Presentations: Softcopy of the PowerPoint slides used during the in-class lectures can be downloaded from Canvas. I will frequently cite material that is not on the slides, so you should plan on taking notes as well as referring to the power point slides.

Outside Readings: Articles and readings will require you to access UNT online library services. Students can access Canvas or UNT Library using the Internet. The site is password protected. You can learn more about Canvas by reviewing the on-line student manuals. Go to https://canvas.unt.edu/ or http://www.library.unt.edu/ and login using your EUID and AMS password.

Class Lectures: Classroom lectures are made available prior to the class and will be posted on Canvas. You should be able to download the lecture notes which are usually in the form of a MS PowerPoint and print them off for class.

COURSE FORMAT

This course will be conducted using a combination of class discussion, class lectures/online synchronous lectures, homework/assignments based on journal articles reading for the week and AnyLogic 8 PLS software exercises, and outside readings. The lectures will cover the assigned topics but will not necessarily present the material as covered in the text or reading. You are highly encouraged to attend all lectures. Please read the assigned material/textbook for the course. The course will emphasize on how simulation optimization approach can be applied to logistics/supply chain/operations issues using the concepts learnt in earlier courses. The course is conducted for a duration of 15 weeks.

GRADING

Grade Determination

Grades will be based upon performance on the following:

Homework's	30%	300 points
Research Proposal	10%	100 points
Research Paper & Presentation	40%	400 points
Presentation of Discussion Papers	20%	200 points
	100%.	1000 points

Grade Distribution (in percentage):

- A: > 89% (Outstanding, excellent work. The student performs well above the minimum criteria.)
- B: Greater than 79% less than equal 89% (Good, impressive work. The student performs above the minimum criteria.)
- C: Greater than 69% less than equal 79% (Solid, college-level work. The student meets the criteria of the assignment.)
- F: less than equal 69% (Sub-par work. The student fails to complete the assignment.)

HOMEWORKS

Homework's are two types: (i) Article Summaries, and (ii) Simulation Exercises. ***Each week you will either have a combination of two or just one of the two***. Refer to schedule in the later part of the syllabus for more details.

Article Summary

Each student will summarize each article from the reading list. Article summaries shall be no more than 2 pages and must follow the format below. Article summaries will be turned in (hard copy) at the beginning of class. You are expected to respectfully challenge one another's ideas and inferences as well those of the instructor. Each week, you are expected to arrive prepared to answer the following questions with respect to each article assigned for that class period:

- What is the major problem/issue addressed by the article?
- What are the major theoretical contributions?
- What are the major practical/applied contributions?
- What are your two primary constructive criticisms of this article?
- At article's end, what relevant gaps in our understanding of the topic addressed in the article still exist? What directions should future research take?"

Article Summary Format

Article Title, Year, Journal:	
Author/s:	
Purpose:	
Problems/ Issues/Gaps & Importance	
Theories	
Hypotheses or Propositions (annotate each supported and not). Insert model graphic as well, if applicable.	
Methodology & Type of Data	
Major Theoretical Contributions	

Practical Contributions	
Future Research	

Simulation Exercise

The simulation exercise is typically either end of chapter exercises and/or case-studies from the *Big Book of Simulation Using AnyLogic 8.0*. More details will be provided within the first two weeks of the course.

RESEARCH PAPER

Students are required to write a journal quality research paper. *Research paper is the only group activity in the course, and max of 2 students per group (if we have an odd number of students registered in the course-one team will be an exception to either have 3 members or 1 member).* Students will apply combination of simulation and optimization (simulation optimization) to any topic related to logistics and supply chain management including the four topics that will be discussed in the course. The purpose of this paper is to (1) allow you to immerse yourself into the application of systems theory and (2) provide you with experience in preparing and executing a study worthy of submission for publication. These papers should be original work that can make a contribution to the logistics and supply chain management literature. A key aspect of research is an understanding the publishing process and how topics and papers fit to a specific journal.

This paper should include a clear statement of the research problem, the proposed contribution of the research, a literature review, theoretical framework with hypotheses/propositions and supporting arguments, the research methodology, and conclusions concerning what the research will show. There is a 20-25-page range (double-spaced) for the paper. Note that no collection of data is required.

Students must secure approval from the instructor regarding topic and scope of coverage. The paper should be of a quality suitable for either *Winter Simulation Conference 2023 (or) CSCMP Annual Conference 2023 (or) Annual Decision Sciences Conference 2023 or Journal of Simulation. However, students should aim for a research paper that would have a potential be to publish in a A-Level Journal.*

Students will prepare and submit a research proposal. The proposal will serve as the foundation for the research paper; thus, it is important that the proposal be as thoroughly developed as possible. The proposal shall be no more than 5 pages in length, double spaced, 12-point type, and excluding references. The proposal should include a conceptual model of propositions. It must identify the underlying theories (if applicable), define the relevant constructs/variables, flow chart of simulation/simulation optimization approach and thoroughly describe the contributions the research is expected to make.

Students will make a 15-20 minute presentation of their research papers. This will provide you with an opportunity to receive feedback on your research idea(s).

WEEKLY DISCUSSION PRESENTATION

Every week there are a minimum of four articles that will be discussed in the class, the same articles are read in advance by each student and submitted as part of the homework, as mentioned earlier in the homework section. ***However, each week one student will present his/her summary of articles in a PPT format, the student will receive a maximum of 20 min to present to the class. In the first week of the class students can determine when they would like to present in the semester. A student will only present three times during the entire semester.***

Since there are currently five students in our class, each student will pick three specific weeks/topics to present the papers via PPT, followed by a discussion by instructor.

WRITING FORMAT-FOR HOMEWORKS and RESEARCH PAPER

Please note that format will be graded. All written assignments, unless otherwise indicated, must comply with the following guidelines. Assignments that do not follow this format may not be accepted or may be subject to at least a one-letter grade penalty.

- Unless otherwise noted, electronic copies of assignments are NOT acceptable.
- Assignments should be printed double spaced and be on 8.5" X 11" paper with uniform margins (1"). You may print on both sides of a page.
- Handwritten papers are not acceptable.
- Font size must be 12 points.
- Papers need only be stapled in the upper left-hand corner. Folded corners, paper clips or loose papers are NOT acceptable.
- Spelling, **grammar**, and "typos" will be considered in your grade. Papers that evidence a lack of proof reading or professional presentation may be penalized 1 letter grade.
- Turn in with the research paper evidence that the paper has been screened by plagiarism-detection software (Turnitin in Canvas), including the screening results. In addition to submitting a hard copy, you must upload your paper to Canvas.

ANYLOGIC, ANYLOGISTIX, FICO® XPRESS OPTIMIZATION, ARENA and SIM-PY

Simulation tools: ANYLOGIC, ANYLOGISTIX, ARENA and SIM-PY
Optimization tools: FICO® XPRESS OPTIMIZATION and ANYLOGISTIX

Why Simulation (please read it here): https://www.anylogic.com/use-of-simulation/
Developing Disruptive Business Strategies with Simulation:
https://www.anylogic.com/resources/white-papers/developing-disruptive-business-strategies-with-simulation/
For the most part of the course we will be using ***AnyLogic 8.0 Personal Learning Edition*** which is available at this website for free download: www.anylogic.com/downloads/ please note that if you wish to not install it, the version of the same software is available on virtual computer, more instructions are available here: https://cob.unt.edu/lab/virtual-lab

For one or two assignments we will also be utilizing AnyLogistix PLS, FICO® Xpress Optimization, and SimPy.

AnyLogistix PLS is a transportation and supply chain based optimization and simulation tool which can be downloaded from here: https://www.anylogistix.com/personal-learning-edition/

FICO® Xpress Optimization: It is a tool very similar to CPLEX Optimizer used for solving large complex optimization problems. License information will be shared personally when requested by student. More information can be found here:

SimPy: "*SimPy is a discrete-event simulation library. The behavior of active components (like vehicles, customers or messages) is modeled with processes. All processes live in an environment. They interact with the environment and with each other via events*."[1] More information can be found here: https://simpy.readthedocs.io/en/latest/index.html

ARENA: Arena is a discrete-event simulation tool similar to AnyLogic, it's another tool that be utilized in case you do not want to use AnyLogic. Link to download: https://www.arenasimulation.com/academic/students

Students are strongly encouraged to use of these tools as part of their final research paper, at the minimum a simulation tool needs to be used, optimization tool is optional to be used.

UNT COLLEGE OF BUSINESS STUDENT ETHICS STATEMENT

As a student of the UNT College of Business, I will abide by all applicable policies of the University of North Texas, including the Student Standards of Academic Integrity, the Code of Student Conduct and Discipline and the Computer Use Policy. I understand that I am responsible reviewing the policies as provided by link below before participating in this course. I understand that I may be sanctioned for violations of any of these policies in accordance with procedures as defined in each policy.

I will not engage in any acts of academic dishonesty as defined in the Student Standards of Academic Integrity, including but not limited to using another's thoughts or words without proper attribution (plagiarism) or using works in violation of copyright laws. I agree that all assignments I submit to the instructor and all tests I take shall be performed solely by me, except where my instructor requires participation in a group project in which case, I will abide by the specific directives of the instructor regarding group participation.

While engaged in on-line coursework, I will respect the privacy of other students taking online courses and the integrity of the computer systems and other users' data. I will comply with the copyright protection of licensed computer software. I will not intentionally obstruct, disrupt, or interfere with the teaching and learning that occurs on the website dedicated to this course through computer "hacking" or in any other manner.

I will not use the university information technology system in any manner that violates the UNT nondiscrimination and anti-sexual harassment policies. Further, I will not use the university information technology system to engage in verbal abuse, make threats, intimidate, harass, coerce, stalk or in any other manner which threatens or endangers the health, safety or welfare of any person. Speech protected by the First Amendment of the U.S. Constitution is not a violation

[1] https://simpy.readthedocs.io/en/latest/simpy_intro/basic_concepts.html

of this provision, though fighting words and statements that reasonably threaten or endanger the health and safety of any person are not protected speech.

Student Standards of Academic Integrity
Code of Student Conduct and Discipline
Computer Use Policy

GETTING HELP

Technical Assistance

Part of working in the online environment involves dealing with the inconveniences and frustration that can arise when technology breaks down or does not perform as expected. Here at UNT we have a Student Help Desk that you can contact for help with Canvas or other technology issues.

UIT Help Desk: http://www.unt.edu/helpdesk/index.htm
Email: helpdesk@unt.edu
Phone: 940-565-2324
In Person: Sage Hall, Room 130
Walk-In Availability: 8am-9pm
Telephone Availability:

- Sunday: noon-midnight
- Monday-Thursday: 8am-midnight
- Friday: 8am-8pm
- Saturday: 9am-5pm

Laptop Checkout: 8am-7pm

For additional support, visit Canvas Technical Help (https://community.canvaslms.com/docs/DOC-10554-4212710328)

Student Support Services

UNT provides mental health resources to students to help ensure there are numerous outlets to turn to that wholeheartedly care for and are there for students in need, regardless of the nature of an issue or its severity. Listed below are several resources on campus that can support your academic success and mental well-being:

- Student Health and Wellness Center (https://studentaffairs.unt.edu/student-health-and-wellness-center)
- Counseling and Testing Services (https://studentaffairs.unt.edu/counseling-and-testing-services)
- UNT Care Team (https://studentaffairs.unt.edu/care)
- UNT Psychiatric Services (https://studentaffairs.unt.edu/student-health-and-wellness-center/services/psychiatry)
- Individual Counseling (https://studentaffairs.unt.edu/counseling-and-testing-services/services/individual-counseling)

Other student support services offered by UNT include

- Registrar (https://registrar.unt.edu/registration)
- Financial Aid (https://financialaid.unt.edu/)
- Student Legal Services (https://studentaffairs.unt.edu/student-legal-services)
- Career Center (https://studentaffairs.unt.edu/career-center)
- Multicultural Center (https://edo.unt.edu/multicultural-center)
- Counseling and Testing Services (https://studentaffairs.unt.edu/counseling-and-testing-services)
- Pride Alliance (https://edo.unt.edu/pridealliance)
- UNT Food Pantry (https://deanofstudents.unt.edu/resources/food-pantry)

Academic Support Services

- Academic Resource Center (https://clear.unt.edu/canvas/student-resources)
- Academic Success Center (https://success.unt.edu/asc)
- UNT Libraries (https://library.unt.edu/)
- Writing Lab (http://writingcenter.unt.edu/)
- MathLab (https://math.unt.edu/mathlab)

AMERICANS 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 you have an established disability as defined in the Act and would like to request accommodation, please see me as soon as possible. I can be contacted at the location and phone number shown in this syllabus. Please note: University policy requires that students notify their instructor within the first week of class than an accommodation will be needed. Please do not hesitate to contact me now or in the future if you have any questions or if I can be of assistance.

Please note if you are an International student with disability, reasonable accommodations will be made available for qualifying student on par with what's stated above.

EMERGENCY NOTIFICATION & PROCEDURES

UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.

RETENTION OF STUDENT RECORDS

Student records pertaining to this course are maintained in a secure location by the instructor of record. All records such as exams, answer sheets (with keys), and written papers submitted during the duration of the course are kept for at least one calendar year after course completion. Course work completed via the canvas online system, including grading information and comments, is also stored in a safe electronic environment for one year. Students have the right to view their

individual record; however, information about student's records will not be divulged to other individuals without proper written consent. Students are encouraged to review the Public Information Policy and the Family Educational Rights and Privacy Act (FERPA) laws and the University's policy. See UNT Policy 10.10, Records Management and Retention for additional information.

ACCEPTABLE STUDENT BEHAVIOR

Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University's expectations for student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc.
Visit UNT's Code of Student Conduct (https://deanofstudents.unt.edu/conduct) to learn more.

ACCESS TO INFORMATION - EAGLE CONNECT

Students' access point for business and academic services at UNT is located at: my.unt.edu. All official communication from the University will be delivered to a student's Eagle Connect account. For more information, please visit the website that explains Eagle Connect and how to forward e-mail Eagle Connect (https://it.unt.edu/eagleconnect).

SEXUAL ASSAULT PREVENTION

UNT is committed to providing a safe learning environment free of all forms of sexual misconduct, including sexual harassment sexual assault, domestic violence, dating violence, and stalking. Federal laws (Title IX and the Violence Against Women Act) and UNT policies prohibit discrimination on the basis of sex, and therefore prohibit sexual misconduct. If you or someone you know is experiencing sexual harassment, relationship violence, stalking, and/or sexual assault, there are campus resources available to provide support and assistance. UNT's Survivor Advocates can assist a student who has been impacted by violence by filing protective orders, completing crime victim's compensation applications, contacting professors for absences related to an assault, working with housing to facilitate a room change where appropriate, and connecting students to other resources available both on and off campus. The Survivor Advocates can be reached at SurvivorAdvocate@unt.edu or by calling the Dean of Students Office at 940-565- 2648. Additionally, alleged sexual misconduct can be non-confidentially reported to the Title IX Coordinator at oeo@unt.edu or at (940) 565 2759.

STUDENT VERIFICATION

UNT takes measures to protect the integrity of educational credentials awarded to students enrolled in distance education courses by verifying student identity, protecting student privacy, and notifying students of any special meeting times/locations or additional charges associated with student identity verification in distance education courses.
See UNT Policy 07-002 Student Identity Verification, Privacy, and Notification and Distance Education Courses (https://policy.unt.edu/policy/07-002).

USE OF STUDENT WORK

A student owns the copyright for all work (e.g. software, photographs, reports, presentations, and email postings) he or she creates within a class and the University is not entitled to use any student work without the student's permission unless all of the following criteria are met:

- The work is used only once.
- The work is not used in its entirety.
- Use of the work does not affect any potential profits from the work.
- The student is not identified.
- The work is identified as student work.

If the use of the work does not meet all of the above criteria, then the University office or department using the work must obtain the student's written permission.
Download the UNT System Permission, Waiver and Release Form

PROPOSED CLASS SCHEDULE We will try to stay as close as possible to this proposed schedule, however if any changes take place, I will notify all students, this might include field trip opportunities, bringing in industry experts for guest lectures etc. This syllabus and schedule are tentative and subject to change.

#	Date (Every Thu)	Topic Name (T)	Journal Articles/Readings *O: Optional Readings ILL: Inter Library Loan*	Deadlines (Thursday)
1	19-Jan-23	Introduction and Syllabus Chapter 1: Modeling and Simulation Modeling	No Readings	
2	26-Jan-23	Chapter 2: Chapter 2. The three methods in simulation modeling Discussion: Supply Chain Simulation/Simulation Optimization	https://doi.org/10.1111/j.1540-5915.2005.00066.x https://doi-org.libproxy.library.unt.edu/10.1016/j.jom.2004.05.002 ***(O)*** *https://doi.org/10.1080/0740817X.2015.1019162* *https://doi.org/10.1016/j.simpat.2016.02.001* https://doi.org/10.1108/09600030910951692	**HW1**
3	2-Feb-23	Chapter 3: Agent Based Modeling. Technology Overview Discussion: Supply Chain Simulation/Simulation Optimization **Guest Lecture: Dr. Benton from Ohio State-Fisher**	https://doi.org/10.1080/00207543.2017.1421787 https://doi.org/10.1108/09600031111166401 https://doi.org/10.1111/j.1540-5915.2011.00324.x https://doi.org/10.1016/j.ejor.2018.02.047 ***(O)*** https://ieeexplore.ieee.org/abstract/document/1574242 ***(O)-ILL***	**HW2**
4	9-Feb-23	Chapter 3: Agent Based Modeling. Technology Overview Discussion: Supply Chain Simulation/Simulation Optimization	https://doi.org/10.1016/j.cie.2019.02.023 https://doi.org/10.1016/j.jom.2018.05.001 https://doi.org/10.1111/j.2158-1592.2011.01003.x https://doi.dox.org/10.1177/0037549717698034 http://doi.org/10.31387/oscm0230159 ***(O) - ILL*** https://ssrn.com/abstract=3593540 ***(O)*** https://ieeexplore.ieee.org/document/6193170 ***(O) - IIL***	**HW3**
5	16-Feb-23	Chapter 3: Agent Based Modeling. Technology Overview Discussion: Supply Chain Simulation and Additive Manufacturing/3D printing	https://doi.org/10.1002/joom.1054 https://doi.org/10.1080/00207543.2016.1231433 https://doi.org/10.1016/j.ijpe.2019.07.035 https://doi.org/10.1007/s00291-020-00608-7 https://doi.org/10.1080/00207543.2019.1612964 ***(O)***	**HW4**
6	23-Feb-23	Chapter 4: How to build agent based models. Discussion: Hospital Logistics and Distracted Driving	http://dx.doi.org/10.1016/j.aap.2017.10.009 http://dx.doi.org/10.1016/j.ergon.2016.09.004 https://doi.org/10.1057/jos.2016.6 https://doi.org/10.1080/01605682.2018.1510805 https://doi.org/10.1007/s10479-019-03500-y ***(O)***	**HW5**

#	Date (Every Thu)	Topic Name (T)	Journal Articles/Readings ***O: Optional Readings*** ***ILL: Inter Library Loan***	Deadlines (Thursday)
7	2-Mar-23	Chapter 4: How to build agent-based models. Discussion: Warehouse/DC AMR and Distracted Driving **Guest Lecture: Dr. Chopra from Kellogg School of Management**	https://doi.org/10.1016/j.trc.2020.01.006 https://doi.org/10.1016/j.trf.2018.06.023 https://doi.org/10.1080/00207543.2018.1483587 https://doi.org/10.1016/j.ejor.2021.01.019 https://ieeexplore.ieee.org/document/9004792 ***(O)***	**HW6**
8	9-Mar-23	Chapter 5: System Dynamics and Dynamic Systems Discussion: AMR and Health Care Simulation	10.1109/WSC40007.2019.9004792 https://doi.org/10.1016/j.ejor.2021.01.019 https://doi.org/10.1007/s10479-019-03500-y	**HW7 Research Proposal**
9	23-Mar-23	Chapter 6: Multi-method modeling Discussion: Health Care	https://doi.org/10.1016/j.simpat.2014.05.007 https://doi.org/10.1016/j.cie.2016.03.029 https://doi.org/10.1016/j.ejor.2013.03.010	**HW8**
10	30-Mar-23	Chapter 7: Designing State-Based Behavior: State Charts Discussion: Field Service Optimization	TBA	**HW9**
11	6-Apr-23	Chapter 7: Designing State-Based Behavior: State Charts Discussion: Peer-to-Peer Asset Sharing	TBA	**HW10**
12	13-Apr-23	Chapter 8. Discrete Events and the Event Model Element Discussion: Using Secondary Data for Conducting Supply Chain Research	TBA	**HW11**

#	Date (Every Thu)	Topic Name (T)	Journal Articles/Readings *O: Optional Readings ILL: Inter Library Loan*	Deadlines (Thursday)
13	20-Apr-23	Chapter 8. Discrete Events and the Event Model Element Discussion: Emerging Technologies **Guest Lecture: Dr. Kannan Govindan from University of Southern Denmark**	TBA	**HW12**
14	27-Apr-23	Systemigram and Systems Thinking Discussion: Systems Thinking	TBA	**HW13**
15	4-May-23	Chapter 8. Discrete Events and the Event Model Element	TBA	**HW14**
16	Finals Week May 8-12, 2023	**Presentations of Research Paper**	**Research Paper Due May 12th in Canvas**	