

ISYE 466/566: Analysis and Design of Supply Chain Systems

Syllabus

Term: Fall 2022

Credit hours: 3

Classroom: Engineering building 358

Days and Times: Tuesday/Thursday 9:30 am – 10:45 am

Instructor: Dr. Ziteng Wang

- **Office:** EB 240
- **Email:** zwang3@niu.edu
- **Phone:** (815) 753-9971

Office hour: Thursday 11:00 am – 12:00 pm or by appointment

Teaching assistant:

- Name: Sharjeeluddin Haqqani Mohammed
- Email: Z1945931@students.niu.edu
- Office hour: Tuesday 11:00 am – 12:00 pm
- Room: Logistics lab (EB 251)

Course description: Analysis of material and information flows in complex production-distribution networks. Knowledge and the tools necessary to develop, implement, and sustain strategies for designing supply chains. Focus on the use of analytical modeling techniques to understand and manage supply chains. Topics include planning demand and supply, inventory management, transportation, network design and facilities decisions, and coordination in a supply chain.

Prerequisites:

- (Catalog requirement) ISYE 440/540 or consent of department
- (Highly recommended) Operations Research (Linear programming; ISYE 370 or equivalent)
- (Recommended) Probability and Statistics (ISYE 335 or equivalent)
- (Highly necessary) Spreadsheet skills (Microsoft Excel or equivalent)

Textbook:

- [*Supply Chain Management: Strategy, Planning, and Operation*](#), 7th Edition, Sunil Chopra, Pearson Education, 2019.

Course objective: To provide students with the ability to analyze complex production-distribution networks. To teach students the use of mathematical models to solve strategic, tactical, and operational decision problems associated to supply chain.

Learning outcomes: Upon completion of this course, a student should be able to do the following:

- Describe the structure, strategy, drivers, and metrics of a supply chain.
- Understand and use the quantitative models for supply chain network design

- Understand and use the quantitative models for demand and supply planning
- Understand and use the quantitative models for inventory management
- Understand and use the quantitative models for transportation decisions

Relation to undergraduate program outcomes. This course contributes to the following outcomes of the undergraduate program:

- 1. An ability to identify, formulate, and solve complex Industrial and Systems engineering problems by applying principles of engineering, science, and mathematics
- 2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- 3. An ability to communicate effectively with a range of audience.
- 4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- 5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives.
- 7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Relation to graduate program outcomes. This course contributes to the following outcomes of the graduate program:

- A. An ability to define and formulate Industrial and Systems Engineering problems.
- B. An ability to apply math and scientific tools to define, design, predict, improve, and optimize the system performance.
- C. An ability to independently learn advanced topics in Industrial and Systems Engineering.
- D. An ability to conduct research or project professionally and ethically.
- E. An ability to effectively communicate ideas/concepts and research findings through technical reports and professional presentations.

Assignments and Grading:

- Homework: 25%
- Midterm exam: 25%
 - Time: **Thursday, October 13, 9:30 a.m. – 10:45 a.m.**
 - Location: Logistics Lab (EB 251)
- Final exam: 25%
 - Time: **Thursday, December 08, 10:00 a.m. – 11:50 a.m.**
 - Location: Logistics Lab (EB 251)
- Project: 25%
 - Students may complete the project individually or in team of two or three.
 - A list of case studies will be provided. Students may choose a case study from the list or use one found elsewhere which must be approved by the instructor.
 - Project proposal due: **Sunday, October 16, 2022, 11:59 pm.**
 - Project final report due: **Thursday, December 08, 2022, 11:59 pm.**
- Bonus: 0 – 4 points
 - The bonus assignment is optional.

- The bonus assignment is a 15-minute in-class presentation. Topic of the presentation is the supply chain strategy, planning, and operation of a well-known company (like Apple, IKEA, Zara). Present your findings to the class.
- The bonus assignment can be done individually or by a group of two students.
- Students should sign up with instructor and get approval of the topic to be presented.
- There will be no more than one presentation in each class. Once all available spots are signed up, no more presentations will be accepted.
- Each student will receive a letter grade based on his or her cumulative percentage score according to the following scales:
 - A 94 – 100
 - A- 88 – 93.99
 - B+ 82 – 87.99
 - B 76 – 81.99
 - B- 70 – 75.99
 - C+ 64 – 69.99
 - C 58 – 63.99
 - C- 52 – 57.99
 - D 46 – 51.99
 - F 0 – 45.99
- Exam policies:
 - Students must complete the exams individually. Receiving help from others or giving help to others is strictly prohibited. No late work will be accepted.
 - Students must contact the instructor ahead of time if unable to take an exam within its specified time frame except for medical or other emergencies after which proper documentation will be required.
 - No make-up exams will be allowed without instructor's approval.

Tentative course schedule:

Week	Date(s)	Topics	
		Tuesday	Thursday
1	08/23, 08/25	Course overview. Introduction to Supply Chain	Understand the Supply Chain
2	08/30, 09/01	Supply chain strategic framework	Supply chain strategic framework
3	09/06, 09/08	Supply chain strategic framework	Review of linear programming and spreadsheet solver
4	09/13, 09/15	Review of linear programming and spreadsheet solver	Designing the supply chain network
5	09/20, 09/22	Designing the supply chain network	Designing the supply chain network
6	09/27, 09/29	Designing the supply chain network	Planning and coordinating demand and supply
7	10/04, 10/06	Planning and coordinating demand and supply	Planning and coordinating demand and supply
8	10/11, 10/13	Midterm review	Midterm exam: Thursday, October 13, 9:30 a.m. - 10:45 a.m.
9	10/18, 10/20	Planning and managing inventories	Planning and managing inventories

10	10/25, 10/27	Planning and managing inventories	Planning and managing inventories
11	11/01, 11/03	Transportation in a supply chain	Transportation in a supply chain
12	11/08, 11/10	Transportation in a supply chain	Transportation in a supply chain
13	11/15, 11/17	Managing cross-functional drivers	Managing cross-functional drivers
14	11/22, 11/24	Managing cross-functional drivers. Final exam review.	THANKSGIVING – no class
15	11/29, 12/01	Project presentations	
16	12/08		Final exam: Thursday, December 08, 10:00 a.m. - 11:50 a.m.

Academic integrity: Good academic work must be based on honesty. The attempt of any student to present as his or her own work that which he or she has not produced is regarded by the faculty and administration as a serious offense. Students are considered to have cheated if they copy the work of another during an examination or turn in a paper or an assignment written, in whole or in part, by someone else. Students are guilty of plagiarism, intentional or not, if they copy material from books, magazines, or other sources without identifying and acknowledging those sources or if they paraphrase ideas from such sources without acknowledging them. Students guilty of, or assisting others in, either cheating or plagiarism on an assignment, quiz, or examination may receive a grade of F for the course involved and may be suspended or dismissed from the university.

Accommodations for students with disabilities: If you need an accommodation for this class, please contact the Disability Resource Center as soon as possible. The DRC coordinates accommodations for students with disabilities. It is located in the Campus Life Building, Suite 180, and can be reached at 815-753-1303 or drc@niu.edu.

Also, please contact me privately as soon as possible so we can discuss your accommodations. Please note that you will not be required to disclose your disability, only your accommodations. The sooner you let me know your needs, the sooner I can assist you in achieving your learning goals in this course.

Syllabus change policy: This syllabus is a guide and every attempt is made to provide an accurate overview of the course and its requirements. However, certain circumstances may make it necessary for me to modify the syllabus during the semester for your benefit and the changes may depend, in part, on course progress and our needs. I will announce any change to the syllabus as early as possible so that you can adjust your schedule. The department/ school will also be notified of any change.