RUTGERS
Rutgers Business School
Newark and New Brunswick

Supply Chain Management
Course Number: 26:799:660
Course Title: Supply Chain Modeling and Algorithms

COURSE DESCRIPTION

This course focuses on the application of operations research and management science techniques to model and solve the newest emerging supply chain management problems (such as supply chain disruption problems, integrated supply chain design problems, container vessel planning problems, emergency logistic problems, and supply chain contract design) to meet the changing needs of new generations of SCM Ph.D. students. The course also emphasizes the design of search algorithms and the analysis of computational performance to effectively solve practical business decision and optimization problems.

COURSE MATERIALS

There is no required textbook for the course. Selected academic journal articles to be discussed in classes are listed in Appendix. All these papers are free for Rutgers students via the link from Rutgers library. Some class notes will be gradually posted on Canvas class website.

Class Website Canvas

ACADEMIC INTEGRITY

I do NOT *tolerate cheating*. Students are responsible for understanding the RU Academic Integrity Policy http://academicintegrity.rutgers.edu/

I will strongly enforce this Policy and pursue *all* violations. On all examinations and assignments, students must sign the RU Honor Pledge, which states, "On my honor, I have neither received nor given any unauthorized assistance on this examination or assignment." I will screen all written assignments through *SafeAssign* or *Turnitin*, plagiarism detection services that compare the work against a large database of past work. Don't let cheating destroy your hard-earned opportunity to learn. See business.rutgers.edu/ai for more details.

GRADING POLICY

Class presentation and participation: 40%
Midterm: 30%

Final Exam: 30%

Make-up Exam Policy
There will be no make-up exams unless you have a serious reason, and, in such cases, you **must** notify the instructor **5 days** before the exams.

COURSE SCHEDULE

TOPIC
Syllabus and Course Introduction Supply Chain Management Problems: Concepts, Literature Review, Trend, Methods and Algorithms A Small-scale Supply Chain Competition Problem: Model and Analysis
A Small-scale Supply Chain Competition Problem: Model and Analysis Continued) Facility Location Problem Branch-Bound Algorithm
Supply Chain Disruption Problem Integrated Supply Chain Design Problem Lagrangian Relaxation
Integrated Production and Distribution Scheduling Problem Network Flow Modeling Heuristic 1
Error Bound and Worst Case Analysis
Container Vessel Scheduling Problem Heuristic 2
Exam 1
No Class
Supply Chain Contract and Information Sharing
Supply Chain/Marketing/Economics Interface Problem
Presentation 1
Presentation 2
Exam 2
Class Wrap-up and Discussions

Appendix: Course Materials

Lecture Materials
1. L. Qi, J. Shi, and X. Xu (2015). "Supplier Competition and its Impact on Firm's Sourcing Strategy". *Omega, the International Journal of Management Science*, 55, 91-110.

2. M.A. Efroymson and T.L. Ray (1966). "A Branch-Bound Algorithm for Plant Location". *Operations Research*, 14, 361-368.

3. L. Qi, Z.M. Shen, and L. Snyder (2009). "A Continuous-Review Inventory Model with Disruptions at Both Supplier and Retailer". *Production and Operations Management*, 18, 516-532.

4. L. Qi, Z.M. Shen, and L. Snyder (2010). "The Effect of Supply Uncertainty on Supply Chain Design Decisions". *Transportation Science*, 44, 274-289.

5. S. Gao, L. Qi, and L. Lei (2015). "Integrated Batch Production and Distribution Scheduling with Limited Vehicle Capacity". *International Journal of Production Economics*, 160, 13-25.

6. L. Qi and Z.M. Shen (2010). "Worst-case Analysis of Demand Point Aggregation for the Euclidean p-median Problem". *European Journal of Operational Research*, 202, 434-443.

7. Z. Chen, L. Lei, and H. Zhong (2007). "Container Vessel Scheduling with Bi-directional Flows". *Operations Research Letters*, 35, 186-194.

8. L. Lei, M. Pinedo, L. Qi, S. Wang, and J. Yang (2015). "Personnel Scheduling and Supplies Provisioning in Emergency Relief Operations". *Annals of Operations Research*, 235, 487-515.

9. A.Y. Ha and S. Tong (2008). "Contracting and Information Sharing under Supply Chain Competition". *Management Science*, 54, 701-715.

10. L. Qi, L.Y. Chu, and R. Chen (2016). "Quality Provision with Heterogeneous Consumer Reservation Utilities". *Production and Operations Management*, 25, 883-901.

11. J. Zhang, L. Qi, and S. Tong (2021). "Dynamic Contract under Quick Response in a Supply Chain with Information Asymmetry". *Production and Operations Management*, 30, 1273-1289.

Presentation Materials
12. G. Cachon and M. Lariviere (2005). "Supply chain coordination with revenue sharing contracts". *Management Science*, 51, 30-44.

13. M. Christiansen, K. Fagerholt, and D. Ronen (2004). "Ship Routing and Scheduling: Status and Perspective". *Transportation Science*, 38, 1-18.

14. L. Lei, S. Liu, A. Ruszczynski, and S. Park (2006). "On the Integrated Production, Inventory, and Distribution Routing Problem". *IIE Transactions*, 38, 955-970.

15. C. Revelle and G. Laporte (1996). "The Plant Location Problem: New Models and Research Prospects". *Operations Research*, 44, 864-874.

16. Z.M. Shen and L. Qi (2007). "Incorporating Inventory and Routing Costs in Strategic Location Models". *European Journal of Operational Research*, 179, 372-389.

17. B.T. Tomlin (2006). "On the Value of Mitigation and Contingency Strategies for Managing Supply-Chain Disruption Risks". *Management Science*, 52, 639–657.

SUPPORT SERVICES

If you need accommodation for a ***disability***, obtain a Letter of Accommodation from the Office of Disability Services. The Office of Disability Services at Rutgers, The State University of New Jersey, provides student-centered and student-inclusive programming in compliance with the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments of 2008, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1998, and the New Jersey Law Against Discrimination. More information can be found at ods.rutgers.edu.

[Rutgers University-New Brunswick ODS phone (848)445-6800 or email dsoffice@echo.rutgers.edu]

[Rutgers University-Newark ODS phone (973)353-5375 or email ods@newark.rutgers.edu]

If you are ***pregnant***, the Office of Title IX and ADA Compliance is available to assist with any concerns or potential accommodations related to pregnancy.

[Rutgers University-New Brunswick Title IX Coordinator phone (848)932-8200 or email jackie.moran@rutgers.edu]

[Rutgers University-Newark Office of Title IX and ADA Compliance phone (973)353-1906 or email TitleIX@newark.rutgers.edu]

If you seek ***religious accommodations***, the Office of the Dean of Students is available to verify absences for religious observance, as needed.

[Rutgers University-New Brunswick Dean of Students phone (848)932-2300 or email deanofstudents@echo.rutgers.edu]

[Rutgers University-Newark Dean of Students phone (973)353-5063 or email DeanofStudents@newark.rutgers.edu]

If you have experienced any form of ***gender or sex-based discrimination or harassment***, including sexual assault, sexual harassment, relationship violence, or stalking, the Office for Violence Prevention and Victim Assistance provides help and support. More information can be found at http://vpva.rutgers.edu/.

[Rutgers University-New Brunswick incident report link: http://studentconduct.rutgers.edu/concern/. You may contact the Office for Violence Prevention and Victim Assistance at (848)932-1181]

[Rutgers University-Newark incident report link: https://cm.maxient.com/reportingform.php?RutgersUniv&layout_id=7 . You may also contact the Office of Title IX and ADA Compliance at (973)353-1906 or email at TitleIX@newark.rutgers.edu. If you wish to speak with a staff member who is confidential and does **not** have a reporting responsibility, you may contact the Office for Violence Prevention and Victim Assistance at (973)353-1918 or email run.vpva@rutgers.edu]

If students who have experienced a temporary condition or injury that is adversely affecting their ability to fully participate, you should submit a request via https://temporaryconditions.rutgers.edu .

If you are a military *veteran* or are on active military duty, you can obtain support through the Office of Veteran and Military Programs and Services. http://veterans.rutgers.edu/

If you are in need of *mental health* services, please use our readily available services.

[Rutgers University-Newark Counseling Center: http://counseling.newark.rutgers.edu/]

[Rutgers Counseling and Psychological Services–New Brunswick: http://rhscaps.rutgers.edu/]

If you are in need of *physical health* services, please use our readily available services.

[Rutgers Health Services – Newark: http://health.newark.rutgers.edu/]

[Rutgers Health Services – New Brunswick: http://health.rutgers.edu/]

If you are in need of *legal* services, please use our readily available services: http://rusls.rutgers.edu/

Students experiencing difficulty in courses due to ***English as a second language (ESL)*** should contact the Program in American Language Studies for supports.

[Rutgers–Newark: PALS@newark.rutgers.edu]

[Rutgers–New Brunswick: eslpals@english.rutgers.edu]

If you are in need of additional ***academic assistance***, please use our readily available services.

[Rutgers University-Newark Learning Center: http://www.ncas.rutgers.edu/rlc

[Rutgers University-Newark Writing Center: http://www.ncas.rutgers.edu/writingcenter]

[Rutgers University-New Brunswick Learning Center: https://rlc.rutgers.edu/]

[Optional items that many faculty include:

  - Students must sign, date, and return a statement declaring that they understand the RU Academic Integrity Policy.

  - Students must sign, date, and return a statement declaring that they understand this syllabus.]