Q781
Management Science Research Issues II
Fall 2020 Course Outline

Operations Management Area
DeGroote School of Business
McMaster University

COURSE OBJECTIVE

This PhD research course builds on what we covered in 780 (i.e., Management Science Research Issues I), and will include readings from topics related to Mr. Mohammad S. Moshtagh's research interests. To that end, we will investigate "network design for blood products" and "replenishment and pricing decision for perishable products". A number of peer-reviewed works will be discussed at the weekly meetings, which in turn will help identify gaps and develop possible research questions for the PhD thesis.

INSTRUCTOR AND CONTACT INFORMATION

Dr. Manish Verma	Dr. Yun Zhou
DSB 415	DSB 428
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Meeting: Tuesdays 10am to 1pm in ZOOM	

COURSE DESCRIPTION

This course provides an exposure to the core readings, including latest works, in management science that are pertinent to the research interests of the student.

REQUIRED COURSE MATERIALS AND READINGS

There will be weekly readings that would include book chapters and peer reviewed journal articles. Mr. Moshtagh is expected to synthesize the readings into two written documents, one for each area of investigation. Each document should contain a critical review of the pertinent literature, discussion of gaps, and suggestion on how to fill those gaps including any analytical or mathematical work.

EVALUATION

Class Participation	20%
Document # 1	40%
Document # 2	40%
Total	100%

Conversion

At the end of the course your overall percentage grade will be converted to your letter grade in accordance with the following conversion scheme.

Letter Grade	Points	Equivalent Percentage
A+	12	90-100
A	11	85-89
A-	10	80-84
B+	9	77-79
B	8	73-76
B-	7	70-72
F	0	69 and under

SELECTED LIST OF PEER REVIEWED PUBLICATIONS

1. NETWORK DESIGN FOR BLOOD PRODUCTS

a) F. Osorio, S. C. Brailsford, and H. K. Smith, "A structured review of quantitative models in the blood supply chain: A taxonomic framework for decision-making," *Int. J. Prod. Res.*, 2015, doi: 10.1080/00207543.2015.1005766.
b) K. Katsaliaki and S. C. Brailsford, "Using simulation to improve the blood supply chain," in *Journal of the Operational Research Society*, 2007, doi: 10.1057/palgrave.jors.2602195.
c) J. Beliën and H. Forcé, "Supply chain management of blood products: A literature review," *Eur. J. Oper. Res.*, 2012, doi: 10.1016/j.ejor.2011.05.026.
d) G. P. Prastacos, "BLOOD INVENTORY MANAGEMENT: AN OVERVIEW OF THEORY AND PRACTICE.," *Manage. Sci.*, 1984, doi: 10.1287/mnsc.30.7.777.
e) R. Haijema, "Optimal ordering, issuance and disposal policies for inventory management of perishable products," in *International Journal of Production Economics*, 2014, doi: 10.1016/j.ijpe.2014.06.014.

f) D. Zhou, L. C. Leung, and W. P. Pierskalla, "Inventory management of platelets in hospitals: Optimal inventory policy for perishable products with regular and optional expedited replenishments," *Manuf. Serv. Oper. Manag.*, 2011, doi: 10.1287/msom.1110.0334. 34

g) Q. Duan and T. W. Liao, "Optimization of blood supply chain with shortened shelf lives and ABO compatibility," *Int. J. Prod. Econ.*, 2014, doi: 10.1016/j.ijpe.2014.02.012.

h) M. Dillon, F. Oliveira, and B. Abbasi, "A two-stage stochastic programming model for inventory management in the blood supply chain," *Int. J. Prod. Econ.*, 2017, doi: 10.1016/j.ijpe.2017.02.006.

i) S. Rajendran and A. R. Ravindran, "Platelet ordering policies at hospitals using stochastic integer programming model and heuristic approaches to reduce wastage," *Comput. Ind. Eng.*, 2017, doi: 10.1016/j.cie.2017.05.021.

j) S. Gunpinar and G. Centeno, "Stochastic integer programming models for reducing wastages and shortages of blood products at hospitals," *Comput. Oper. Res.*, 2015, doi: 10.1016/j.cor.2014.08.017.

k) H. Ensafian and S. Yaghoubi, "Robust optimization model for integrated procurement, production and distribution in platelet supply chain," *Transp. Res. Part E Logist. Transp. Rev.*, 2017, doi: 10.1016/j.tre.2017.04.005.

l) M. R. G. Samani, S. M. Hosseini-Motlagh, and S. F. Ghannadpour, "A multilateral perspective towards blood network design in an uncertain environment: Methodology and implementation," *Comput. Ind. Eng.*, 2019, doi: 10.1016/j.cie.2019.02.049.

m) F. Osorio, S. C. Brailsford, H. K. Smith, S. P. Forero-Matiz, and B. A. Camacho-Rodríguez, "Simulation-optimization model for production planning in the blood supply chain," *Health Care Manag. Sci.*, 2017, doi: 10.1007/s10729-016-9370-6.

n) F. Osorio, S. C. Brailsford, and H. K. Smith, "Whole blood or apheresis donations? A multi-objective stochastic optimization approach," *Eur. J. Oper. Res.*, 2018, doi: 10.1016/j.ejor.2017.09.005.

o) Z. J. Ma, K. M. Wang, and Y. Dai, "An Emergency Blood Allocation Approach Considering Blood Group Compatibility in Disaster Relief Operations," *Int. J. Disaster Risk Sci.*, 2019, doi: 10.1007/s13753-018-0212-7.

p) Zahiri and M. S. Pishvaee, "Blood supply chain network design considering blood group compatibility under uncertainty," *Int. J. Prod. Res.*, 2017, doi: 10.1080/00207543.2016.1262563.

q) S. Cheraghi and S. M. Hosseini-Motlagh, "Responsive and reliable injured-oriented blood supply chain for disaster relief: a real case study," *Ann. Oper. Res.*, 2018, doi: 10.1007/s10479-018-3050-5.

r) Hamdan and A. Diabat, "A two-stage multi-echelon stochastic blood supply chain problem," *Comput. Oper. Res.*, 2019, doi: 10.1016/j.cor.2018.09.001.

s) F. Salehi, M. Mahootchi, and S. M. M. Husseini, "Developing a robust stochastic model for designing a blood supply chain network in a crisis: a possible earthquake in Tehran," *Ann. Oper. Res.*, 2019, doi: 10.1007/s10479-017-2533-0.

t) N. V. Sahinidis, "Optimization under uncertainty: State-of-the-art and opportunities," in *Computers and Chemical Engineering*, 2004, doi: 10.1016/j.compchemeng.2003.09.017.

u) S. M. J. Mirzapour Al-E-Hashem, H. Malekly, and M. B. Aryanezhad, "A multi-objective robust optimization model for multi-product multi-site aggregate production planning in a supply chain under uncertainty," *Int. J. Prod. Econ.*, 2011, doi: 10.1016/j.ijpe.2011.01.027.

v) H. Aghezzaf, C. Sitompul, and N. M. Najid, "Models for robust tactical planning in multi-stage production systems with uncertain demands," *Comput. Oper. Res.*, 2010, doi: 10.1016/j.cor.2009.03.012.

w) "Blood type distribution by country - Wikipedia." [Online]. Available: https://en.wikipedia.org/wiki/Blood_type_distribution_by_country. [Accessed: 09-Apr-2020].

x) W. H. Organization, *2 0 1 6 Global Status Report on Blood Safety and Availability*. 2017.

2. REPLENISHMENT AND PRICING DECISIONS FOR PERISHABLE PRODUCTS

a) X. Yan, X. Chao, Y. Lu, S. X. Zhou. Optimal Policies for Selling New and Remanufactured Products. Production and Operations Management, 26(9): 1746-1759.
b) Q. Li and P. Yu. Multimodularity and Its Applications in Three Stochastic Dynamic Inventory Problems. M&SOM. 16(3): 455-463, 2014
c) K. Fu, X. Gong and G. Liang. Managing Perishable Inventory Systems with Product Returns and Remanufacturing. 28(6), 1366-1386, 2019.
d) Q. Li, P. Yu, X. Wu (2016) Managing Perishable Inventories in Retailing: Replenishment, Clearance Sales, and Segregation. Operations Research 64(6):1270-1284.
e) X. Chen, Z. Pang and L. Pan (2014. Coordinating Inventory Control and Pricing Strategies for Perishable Products. Operations Research 62(2) https://doi.org/10.1287/opre.2014.1261
f) X. Chao, X. Gong, C. Shi, C. Yang, H. Zhang, and S.X. Zhou (2018), "Approximation algorithms for capacitated perishable inventory systems with positive lead times," Management Science, 64(11), 5038-5061.
g) X. Chao, X. Gong, C. Shi, and H. Zhang (2015). "Approximation algorithms for perishable inventory systems," Operations Research, 63(3), 585-601.
h) H. Zhang, C. Shi, and X. Chao (2016). Approximation Algorithms for Perishable Inventory Systems with Setup Costs. 64(2). https://doi.org/10.1287/opre.2016.1485
i) C. Zhang, T. Ayer, C. White III 2-Approximation Algorithms for Perishable Inventory Control When FIFO Is an Optimal Issuing Policy. https://arxiv.org/abs/1605.01442
j) V. Sarhangian , H. Abouee-Mehrizi , O. Baron, O. Berman (2017).Threshold-Based Allocation Policies for Inventory Management of Red Blood Cells. M&SOM 20(2). https://doi.org/10.1287/msom.2017.0650
k) H. Abouee-Mehrizi , O. Baron, O. Berman, and D. Chen (2019). Managing Perishable Inventory Systems with Multiple Priority Classes. Production and Operations Management, 28(9): 2305-2322.
l) Z. Pang. Optimal dynamic pricing and inventory control with stock deterioration and partial backordering. Operations Research Letters, Volume 39, Issue 5, 2011, Pages 375-379
m) S. Chen, Y. Li, Y. Yang, W. Zhou. (2019). Managing Perishable Inventory Systems With Age-Differentiated Demand. https://ssrn.com/abstract=3229266

ACADEMIC DISHONESTY

It is the student's responsibility to understand what constitutes academic dishonesty. Please refer to the University Senate Academic Integrity Policy at the following URL:

http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf

This policy describes the responsibilities, procedures, and guidelines for students and faculty should a case of academic dishonesty arise. Academic dishonesty is defined as to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. Please refer to the policy for a list of examples. The policy also provides faculty with procedures to follow in cases of academic dishonesty as well as general guidelines for penalties. For further information related to the policy,

please refer to the Office of Academic Integrity at:

http://www.mcmaster.ca/academicintegrity

MISSED ACADEMIC WORK

Late assignments will not be accepted. No extensions are available except under extraordinary circumstances. Please discuss any extenuating situation with your instructor at the earliest possible opportunity.

POTENTIAL MODIFICATIONS TO THE COURSE

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

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STUDENT ACCESSIBILITY SERVICES

Student Accessibility Services (SAS) offers various support services for students with disabilities. Students are required to inform SAS of accommodation needs for course work at the outset of term. Students must forward a copy of such SAS accommodation to the instructor normally, within the first three (3) weeks of classes by setting up an appointment with the instructor. If a student with a disability chooses NOT to take advantage of an SAS accommodation and chooses to sit for a regular exam, a petition for relief may not be filed after the examination is complete. The SAS website is:

http://sas.mcmaster.ca