



Wirtschaftsuniversität Wien
Vienna University of Economics and Business Administration



Wirtschaftsuniversität Wien, Augasse 2-6, 1090 Wien, Austria

Humanitarian Logistics and Healthcare

Class Dates and Time: March 11-13, 2013
9:00AM-12:30PM

Location: Vienna University of Economics and Business
Vienna, Austria

Instructor: Guest Professor Dr. Anna Nagurney
John F. Smith Memorial Professor of Operations Management
Director – Virtual Center for Supernetworks
Isenberg School of Management
University of Massachusetts Amherst, USA
and
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Course Description:

The number of disasters is growing, as well as the number of people affected by them. Logistics plays a central role in all phases of disaster management and supporting humanitarian operations. The fundamental task of a logistics system is to deliver the appropriate supplies, in quality condition, in the right amounts, to the locations at the time that they are needed. However, due to the inherent nature of disasters, humanitarian logistics is faced with unique challenges: the critical infrastructure, including the transportation and communication systems, may have been severely negatively impacted and their functionality compromised; there is a short time window in which to respond with the critical needs products, which must be delivered in order to prevent loss of life and human suffering, and there may be great uncertainty due to the disruptions, among other complications.

This course covers the unique challenges and prospective solutions associated with humanitarian logistics in emergency mitigation and preparedness, disaster response, and recovery. The course overviews the similarities and the differences between commercial supply chains and

humanitarian relief chains, introduces performance metrics, and provides tools for the analysis and design of supply chains for humanitarian critical needs products, as well as for the coordination and teaming of humanitarian organizations. It also covers such major issues as material convergence and earmarked financial funds for disasters.

This short course is based on primary source reading materials, including journal articles, case studies, newspaper articles, and videos.

Required reading materials are given below following the Outline of Course Topics.

Outline of Course Topics

- **Defining logistics and humanitarian logistics**
- **What is a disaster – recent examples and impacts and who are the stakeholders**
- **Commercial versus humanitarian supply chains: similarities and differences**
- **Disaster management cycle phases**
 - ** mitigation and preparedness
 - ** response
 - ** recovery
- **Fundamental issues and questions in humanitarian logistics assessment**
- **Nonlinear network optimization models for humanitarian operations**
 - ** system-optimization versus user-optimization
- **Risk management and vulnerability analysis**
- **Network performance metrics**
 - ** transportation and critical infrastructure
 - ** supply chains
- **The design of critical needs product supply chains**
- **Humanitarian organization coordination and teaming**
- **The role of communication in disaster operations**
- **Humanitarian healthcare supply chains and product perishability**
 - ** blood supply chains
 - ** pharmaceutical supply chains

- **Material convergence and financial funding in humanitarian operations**

Copies of the course lecture materials will be made available online.

Each set of lecture notes contains references and sources.

Requirements

The Required Reading List

The below list is in the chronological order of reading assignments with due dates for completion of the readings.

Please read by the beginning of the course, March 11, 2013:

1. A. S. Thomas and L. R. Kopczak, 2005. From logistics to supply chain management: the path forward in the humanitarian sector. Fritz Institute Report; available at:

<http://www.fritzinstitute.org/PDFs/WhitePaper/FromLogisticsto.pdf>

2. A. Thomas and M. Mizushima, 2005. Logistics training: necessity or luxury? *Forced Migration Review*, 60-61; available at:

<http://www.fritzinstitute.org/PDFs/FMR18/FMR22fritz.pdf>

3. Benita Beamon, 2004. Humanitarian relief chains, issues and challenges, *Proceedings of the 34th International Conference on Computers & Industrial Engineering*, pp. 77-82; available at:

<http://www.docstoc.com/docs/31881727/HUMANITARIAN-RELIEF-CHAINS>

Please read by the beginning of the class on March 12, 2013:

4. L. N. Van Wassenhove, 2006. Blackett Memorial Lecture: Humanitarian aid logistics: supply chain management in high gear, *Journal of the Operational Research Society* 57, 475-489; available at:

http://www.insead.edu/facultyresearch/centres/isic/humanitarian/documents/JORS_Blackettmemoriallecture_Humanitarianaidlogistics-Supplychainmanagementinhighgear.pdf

5. L. Van Wassenhove and A. J. Pedraza Martinez, 2012. Using OR to adapt supply chain management best practices to humanitarian logistics, *International Transactions in Operational Research* 19, 307-322; available at:

<http://onlinelibrary.wiley.com/doi/10.1111/j.1475-3995.2011.00792.x/full>

6. A. Nagurney and Q. Qiang, 2012. Fragile networks: Identifying vulnerabilities and synergies in an uncertain world, *International Transactions in Operational Research* 19, 123-160; available at:

<http://onlinelibrary.wiley.com/doi/10.1111/j.1475-3995.2010.00785.x/full>

7. B. M. Beamon and B. Balcik, 2008. Performance measurement in

humanitarian relief chains, *International Journal of Public Sector Management* 21, 4-25; available at:

<https://catalyst.uw.edu/workspace/file/download/e0d1e5bb77c3e74d287fc8d7680a717972e40f39d1f8f13887ebbf3b5b035e33>

Please read by the beginning of the class, March 13, 2013:

8. B. Balcik, B. M. Beamon, C. C. Krejci, K. M. Muramatsu, and M. Ramirez, 2010. Coordination in humanitarian relief chains: Practices, challenges and opportunities, *International Journal of Production Economics* 126, 22-34; available at:

<https://catalyst.uw.edu/workspace/file/download/e0d1e5bb77c3e74d287fc8d7680a7179f2838d3037a1327b17211961958118c1>

9. A. Nagurney, M. Yu, and Q. Qiang, 2011. Supply chain network design for critical needs with outsourcing, *Papers in Regional Science*, 90, 123-142; available at:

<http://supernet.isenberg.umass.edu/articles/CriticalNeedsSupplyChainNetworkDesign.pdf>

10. Q. Qiang and A. Nagurney, 2012. A bi-criteria indicator to assess supply chain network performance for critical needs under capacity and demand disruptions, *Transportation Research A*, 46(5), 801-812; available at:

<http://supernet.isenberg.umass.edu/articles/bicriteria.pdf>

11. A. Nagurney, A. H. Masoumi, and M. Yu, 2012. Supply chain network operations management of a blood banking system, *Computational Management Science*, 9(2), 205-231; available at:

<http://supernet.isenberg.umass.edu/articles/BloodSupplyChains.pdf>

12. A. H. Masoumi, M. Yu, and A. Nagurney, 2012. A supply chain generalized network oligopoly model for pharmaceuticals under brand differentiation and perishability, *Transportation Research E*, 48, 762-780; available at:

http://supernet.isenberg.umass.edu/articles/Pharmaceutical_Supply_Chain_Network_Oligopoly.pdf

Please read before submission of your group project paper:

13. F. Toyasaki and T. Wakolbinger, 2011. Impacts of earmarked private donations for disaster fundraising, *Annals of Operations Research*, in press. <http://link.springer.com/article/10.1007/s10479-011-1038-5>

14. L. Destro and J. Holguin-Veras, 2010. Estimating material convergence: Flow of donations for Hurricane Katrina, RPI; available at:

<ftp://ftp.hsrrc.unc.edu/pub/TRB2011/data/papers/11-2897.pdf>

15. N. Altay and W. G. Green III, 2006. OR/MS research in disaster operations management, *European Journal of Operational Research*, 175, 475-494, available at:

<http://www.parvac.washington.edu/courses/inde599/readings/AltayandGreen.pdf>

Additional Readings and Resources

There are additional papers as well as presentations posted on the *Humanitarian Logistics: Networks for Africa* website, which was designed by Professor Anna Nagurney to serve as a repository for information gathered at the Rockefeller Foundation sponsored workshop that she organized and that took place at the Bellagio Center on Lake Como, Italy. The materials are at:

<http://hlogistics.isenberg.umass.edu/>

Also, a podcast of an interview with Professor Nagurney on *Sustaining the Supply Chain*, courtesy of the AMS and Mr. Michael Breen is available at:

<http://www.ams.org/samplings/mathmoments/mm90-relief-podcast>

The students are required to attend the classes. If a student cannot attend class, please notify Professor Nagurney via email prior to the class absence.

Grading

2 page writeup on why you are interested in this course (due in class March 11, 2013). Please highlight any personal experiences that you or your relatives or friends have had in terms of experiencing disasters: **10%**

Class participation: **15%**

Group project paper (due March 27, 2013)*:

The group project papers should be emailed to Professor Nagurney in pdf format. **50%**

In-class group presentation on topic selected for group project: 25%

These class presentations will take place in class on March 13, 2013.

* The group project will consist of 4 students per project (maximum – except with permission of Instructor). The paper should be 10-15 pages in length and written in English. The paper should identify a natural disaster that occurred in the past two decades and a relief organization that assisted during or post the disaster. Identify what the organization did well and what, if anything, it did not do well. Highlight the lessons learned and how you think, with supporting research, the organization's activities in the relief/recovery efforts could have been more effective.
