



**SAUDER**  
School of Business

ROBERT H. LEE  
GRADUATE SCHOOL

## Healthcare Operations Management (MGSC-705) Offered under “Seminar in Management Science”

January – April 2010

### Detailed Schedule (EDT):

Tues/Thurs      1:30pm- 3:30pm during January 7 – February 11, 2010  
Tues                1:30am- 3:30pm during February 16 – April 6, 2010

### Locations:

Montreal:        Peterson Hall, 3460 McTavish room 310  
Vancouver:     UBC’s UCLL 172 – offered simultaneously (i.e., 10:30am – 12:30pm PDT)

### Instructors:

<p>Vedat Verter, Ph.D. Professor, Operations Management Desautels Faculty of Management</p> <p>Director, NSERC CREATE Program on Healthcare Operations &amp; Information Management</p> <p>Co-Director, McGill MD-MBA Program</p> <p><b>Office:</b> Bronfman 542 <b>Phone:</b> 398-4661 <b>E-mail:</b> <a href="mailto:Vedat.Verter@mcgill.ca">Vedat.Verter@mcgill.ca</a> <b>Coordinator:</b> <a href="mailto:Kristen.oliver@mcgill.ca">Kristen.oliver@mcgill.ca</a></p>	<p>Martin L. Puterman, Ph.D. Advisory Board Professor of Operations Sauder School of Business</p> <p>Research Director; UBC Centre for Health Care Management</p> <p>Henry Angus 470 604-822 - 8388 <a href="mailto:marty@chem.ubc.ca">marty@chem.ubc.ca</a> <b>Assistant:</b> <a href="mailto:Farhad.ghassemi@sauder.ubc.ca">Farhad.ghassemi@sauder.ubc.ca</a></p>
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### ***Objectives and Structure of the Course:***

The objective of this course is to provide advanced research training to the doctoral students in healthcare operations management. To this end, the course is structured into two Modules:

- Module I: Decision Analysis (January 7 – February 11, 2010)
- Module II: Designing and Improving Healthcare Processes (February 16 – April 6, 2010)

Module I will provides a comprehensive introduction to how to make decisions in an uncertain environment, which is among the main characteristics of health care processes. It will begin with a short introduction to decision analysis and its applications focusing on its use for analyzing and solving managerial decision problems. The main focus of the course will be formulating and solving Markov decision process (MDP) models. More specifically, our focus will be on formulating and solving finite horizon and discounted models that represent healthcare systems.

Module II builds on the methodology framework presented in the first part in order to study and formulate design problems pertaining to the different phases of the healthcare continuum. It will begin with an overview of the fledgling field of healthcare operations management. Then, we will focus on the design and improvement of preventive care, emergency care, acute care and chronic care systems. Our discussions will be grounded in the care practices for several medical conditions including stroke and breast cancer.

### ***Evaluation:***

Assignments (3)	25%
Midterm Exam	20%
In-class Participation	15%
Research Paper	40%

### ***Textbooks:***

- Puterman, Martin L. [Markov Decision Processes](#), J. Wiley and Sons, New York, NY, (paperback version), 2005.
- Brandeau, Margaret L., F. Sainfort and W. P. Pierskalla (editors) [Operations Research and Health Care: A Handbook of Methods and Applications](#), Kluwer Academic publishers 2004.

### ***Readings (available on line):***

- Puterman, Martin L. "Some Ancient Notes on Decision Analysis"; These notes were prepared for an undergraduate course in decision analysis in 1983 but still seem useful and provide a good introduction to this simple yet very important topic.
- Puterman, Martin L. [Dynamic Programming](#), Encyclopedia of Physical Science and Technology, 2002.

**Academic Integrity:**

It is the student’s responsibility to comply with the rules of academic integrity at McGill University. For further information, please consult the Handbook on Student Rights and Responsibilities (2003) at <http://www.mcgill.ca/integrity/students/> (see p. 17).

**Class Schedule and the Reading List:**

Date	Topic	Remarks
<b>Jan. 7</b>	<i>Course overview - Applications of MDPs and Introduction to Decision Analysis</i> <b>Reading:</b> <a href="#">"Some Ancient Notes on Decision Analysis - Part 1"</a> . Lecture Notes: <a href="#">Decision Analysis I</a>	
<b>12</b>	<b>Reading:</b> <a href="#">"Some Ancient Notes on Decision Analysis - Part 2"</a> and <a href="#">"Some Ancient Notes on Decision Analysis - Part 3"</a> . Lecture Notes: <a href="#">Decision Analysis II - Acquiring and Using Information</a> ; <a href="#">Newsvendor Decision Tree</a>	Prepare Monte Hall Problem in January 7 Lecture Notes and Hatton Realty in “Some Ancient Notes on Decision Analysis - Part 2”
<b>14</b>	<i>Using Information</i>	Prepare: <a href="#">Alberta Exploration</a> (the quintessential decision problem)
<b>19</b>	<i>Utility</i> Lecture Notes: <a href="#">Decision Analysis III -Utility Theory</a>	
<b>21</b>	<i>Markov Decision Process Model Formulation; Finite Horizon Models: Optimality Equations, Backward Induction and Structured Problems</i>	Assignment 1 due
<b>26</b>		
<b>28</b>		
<b>Feb. 2</b>		Assignment 2 due
<b>4</b>	<b>Readings from Puterman 2005</b> , Chapter 1, Chapter 2; Sections 2.1.1 - 2.1.5, 2.2 and Chapter 3; Sections 3.1 - 3.5, 3.7. Chapter 4; Sections 4.1.2-4.1.3, 4.2, 4.3, 4.4, 4.5, 4.6 (Pay most of your attention to 4.5 and 4.6)	
<b>9</b>		Assignment 3 due
<b>11</b>	<b>Mid-Term Exam</b>	
<b>16</b>	<i>Health care operations management – An overview</i> <b>Reading:</b> Brandeau et al 2004, Chapter 1	
<b>23</b>	<i>Designing Healthcare Facility Networks</i> <b>Reading:</b> Brandeau et al 2004, Chapter 3	
<b>Mar. 2</b>	<i>Designing and Improving Preventive Care Programs</i> <b>Reading:</b> Zhang, Y., O. Berman, and V. Verter (2009), “Incorporating Congestion in Preventive Healthcare Facility Network Design”, <i>European Journal of Operational Research</i> , Vol. 198 No. 3, pp. 922-935.	
<b>9</b>	<i>Primary Prevention for Stroke</i> <b>Reading:</b> Kucukyazici, B., V. Verter and M. Blostein, “Designing Optimal Therapy for Prevention of Stroke from Atrial Fibrillation”, Working paper, September 2009	

16	<p><i>Management of Emergency Departments</i></p> <p><b>Reading:</b> Sinreich, David and Marmor, Yariv (2005)'Emergency department operations: The basis for developing a simulation tool', IIE Transactions, 37:3, 233 -245.</p>	
23	<p>Emergency Department Simulation</p> <p><b>Reading:</b> Brandeau et al 2004, Chapters 4, 8</p>	
30	<p><i>Capacity Planning for Acute Care</i></p> <p><b>Reading:</b> Brandeau et al 2004, Chapter 2; Green Linda, Sergei Savin, Ben Wang (2006) Managing Patient Service in a Diagnostic Medical Facility, Operations Research, 54, 11-25.</p>	
Apr. 6	<p><i>Community-based Care Systems</i></p> <p><b>Reading:</b> Kucukyazici, B., V. Verter, L. Nadeau and N. Mayo, "Improving Post-Stroke Health Outcomes: Can Facilitated Care Help?", to appear in <i>Health Policy</i>, accepted in July 2009. doi:10.1016/j.healthpol.2009.07.010</p>	
20	<b>Research Paper Submission Deadline</b>	