

- **Robert H. Smith School of Business** -

Course: 808U Quantitative Modeling for Hospital Operations and Management
Semester: Fall 2006
Instructor: Dr. Bruce Golden
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Course location: 1202 VMH
Course time: Tues and Thurs, 3:30 – 4:45 pm
Office hours: Tues and Thurs, 2:45 – 3:30 pm and by arrangement

Course Overview

Health care costs continue to increase rapidly in the U.S. In fact, in 2004, \$1.9 trillion or 16% of GDP was spent on health care! Operations Research, Information Technology, and effective management are essential tools that can be applied to increase efficiency, make better use of existing resources, and evaluate the impact of additional resources.

In this course, we will focus on hospital operations and management. In this environment, most decisions involve multiple players and multiple criteria. Examples of problems that we might study include:

1. How should operating rooms be scheduled?
2. How should nurses be scheduled?
3. How should emergency surgeries be handled?
4. How much time does each type of surgery take?
5. How many surgeries (roughly) of each type should be scheduled per week?
6. What are the bottlenecks that relate to the scheduling of operating rooms?

7. How can hospital data be used to improve operations?
8. How many ICU beds are required for a given number and type of surgeries per week?
9. How can hospitals utilize operating rooms to maximize revenue? What other goals are important to the hospital?
10. How can management encourage and provide incentive for nurses, surgeons, anesthesiologists, etc. to work together as a team?

This course will be part Ph.D. seminar and part consulting project. We will study the literature in class including interesting applications of linear programming, simulation, and project management. Everyone will be expected to contribute. In addition, we expect to interact (as one, two, or three teams) with key personnel at the University of Maryland Medical Center and try to help them improve hospital efficiency. We will collect real-world data and make recommendations based on this data.

Target Audience

- Ph.D. students in OR/OM/IS and applied mathematics
- MBA students with an undergraduate degree in a quantitative discipline
- MBA students who enjoyed BUSI 620

Course Requirements

- Regular reading assignments
- Classroom participation and presentations
- Team project(s)

Special Features

- Leading experts will speak in class
- Regular interactions with hospital decision makers
- Access to hospital data

- One goal is for the class to prepare a paper for submission to a journal

Grades

Classroom participation and presentations will be worth 50% of the course grade. A team project (or two) involving hospital operations, will account for the remaining half.

Required Text

There will be no required text for the class. However, articles and book chapters will be distributed on a regular basis and the three books listed below will serve as valuable reference material.

Reference Books

1. M. Brandeau, F. Sainfort, and W. Pierskalla (Eds.), Operations Research and Health Care: A Handbook of Methods and Applications, Springer/Kluwer (2004).
2. R. Hall (Ed.), Patient Flow: Reducing Delay in Healthcare Delivery, Springer (2006).
3. Y. Ozcan, Quantitative Methods in Health Care Management: Techniques and Applications, Jossey-Bass (2005).

Academic Integrity

The University's Code of Academic Integrity is designed to ensure that the principles of academic honesty and integrity are upheld. All students are expected to adhere to this Code. The Smith School does not tolerate academic dishonesty. All acts of academic dishonesty will be dealt with in accordance with the provisions of this code. Please visit the following website for more information on the University's Code of Academic Integrity:

<http://www.studenthonorcouncil.umd.edu/code.html>

On each exam or assignment you will be asked to write out and sign the following pledge: “I pledge on my honor that I have not given or received any unauthorized assistance on this exam/assignment.”

Special Needs

Any student with special needs should bring this to the attention of the instructor as soon as possible, but not later than the second week of class.

Key Dates

To be announced.

About the Professor

Bruce Golden received his undergraduate degree in mathematics from the University of Pennsylvania and his masters and doctoral degrees from the Massachusetts Institute of Technology. He joined the faculty of the University of Maryland Business School in 1976 and served as a Department Chairman from 1980 to 1996. Currently, he is the France-Merrick Chair in Management Science in the Robert H. Smith School of Business at the University of Maryland. His research interests include heuristic search, combinatorial optimization, networks, and applied operations research. Bruce has received numerous awards, including the Thomas L. Saaty Prize (1994 and 2005), the University of Maryland Distinguished Scholar-Teacher Award (2000), the INFORMS Award for the Teaching of OR/MS Practice (2003), and the INFORMS Computing Society Prize (2005). He was named an INFORMS Fellow in 2004. Since 1999, Bruce has served as Editor-in-Chief of *NETWORKS*. Before that, he was Editor-in-Chief of the *INFORMS Journal on Computing*.

In addition, he has received numerous contracts and grants, has consulted for a wide variety of organizations, and has served on the Board of Directors of several high-tech companies based in Maryland. In 1980, he founded a management consulting company with several colleagues. The focus was on business logistics. Clients included IBM, UPS, the U.S. Postal Service, the U.S. Air Force, the U.S. Army, Federal Express,

Toyota, DuPont, and many others. In the late 1980's, Bruce co-founded a second company, specializing in the design and sales of vehicle routing software. He and his partners successfully grew these companies and sold them in late 1998. The surviving company is RouteSmart Technologies, Inc.