



Opportunities in Mathematics

November 2010

Ms. Dale Yamaura

Math 208W
Introduction to Operations Research
Spring 2011

Prerequisite: Math 150 or 151 or 154 or 157

Writing intensive course to fulfill lower W
of WQB requirements

What is Operations Research?

A branch of applied mathematics that is used extensively in these areas

- Finance
- Business
- Engineering
- Computing Science
- Health Care

Math 208W will introduce
Operations Research (OR)
with minimal mathematical prerequisites.

Applications will include:

- transportation
- job assignment
- scheduling
- game theory
- hospital utilization, and other topics

Students will work with real world problems arising in industry and analyze / simulate the model.

- Vancouver Coastal Health, and hospitals in general, are hiring more and more people trained in quantitative skills such as those found in Operations Research

Hospital Utilization



Determine how to allocate patients and nurses to hospital beds in a cost efficient way while ensuring proper care.

Disease Treatment



Determine the dosage of radiation or chemicals to administer to a patient in order to remove a tumor but spare the patient.

Queuing



What is the best way to staff a call centre, i.e., decide how many operators to have in the centre at a given time? What is the trade-off between doing this inexpensively (with a few operators) and annoying the customers?

Production



A document service company has several printing facilities located in various cities, each with different printing capabilities and efficiencies. It needs to allocate customer orders to the facilities so that orders can be completed as quickly and as cost effectively as possible.

Scheduling



Schedule final examinations at a university so that conflicts are avoided (or minimized)

Financial Planning



A company has several projects under consideration, each of which will give an annual return over the next 5 years.

Each project requires a certain amount of capital from the company each year.

Assuming that the company can undertake a fraction of each project, how should it allocate funds to each project over the next 5 years in order to maximize the expected return?

Inventory Management



How can a company use the estimated monthly demand for its products to pre-order stock in such a way as to avoid sell-outs and minimize storage costs?

Transportation



Given a collection of loading centres and distribution centres, determine how to transport goods from the loading centres, through the distribution centres, to the designated destinations in a cost effective way.

Math 208W provides excellent preparation for

BUS 336 Data and Decisions

BUS 361 Project Management

BUEC 232 Data and Decisions

BUEC 433 Forecasting

and is complementary to

Math 308 Linear Optimization (Spring 2011)

Industrial Mathematics Program

Operations Research and Applied Statistics
(ORAS)

Surrey Campus

Dr. Randall Pyke (advisor)

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Dr. Tamon Stephen

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ORAS Program Requirements

Lower division requirements

- 3 courses CMPT (120/125/225)
- 5 courses Math (101/151/152/240/251, MACM101)
- 2 courses Statistics (270/285)

Area requirements

- Mathematics (9+), Statistics (4+)

Interdisciplinary

5+ courses in

ACMA BUEC BUS ECON

MACM MATH REM STAT

Careers in Industrial Mathematics

- Academia (MSc, PhD → professor)
- Manufacturers, retail chains, service organizations
- Financial organizations (banks, insurance,...)
- Hospitals and other health care
- Governments
- Independent consultant
- Engineering firms
- Education, and more

Other Mathematics Programs

- Mathematics Major
- Applied Mathematics Major
- Joint Mathematics and Computing (MACM)
- Mathematical Physics Honors Program

- Mathematics Minor

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