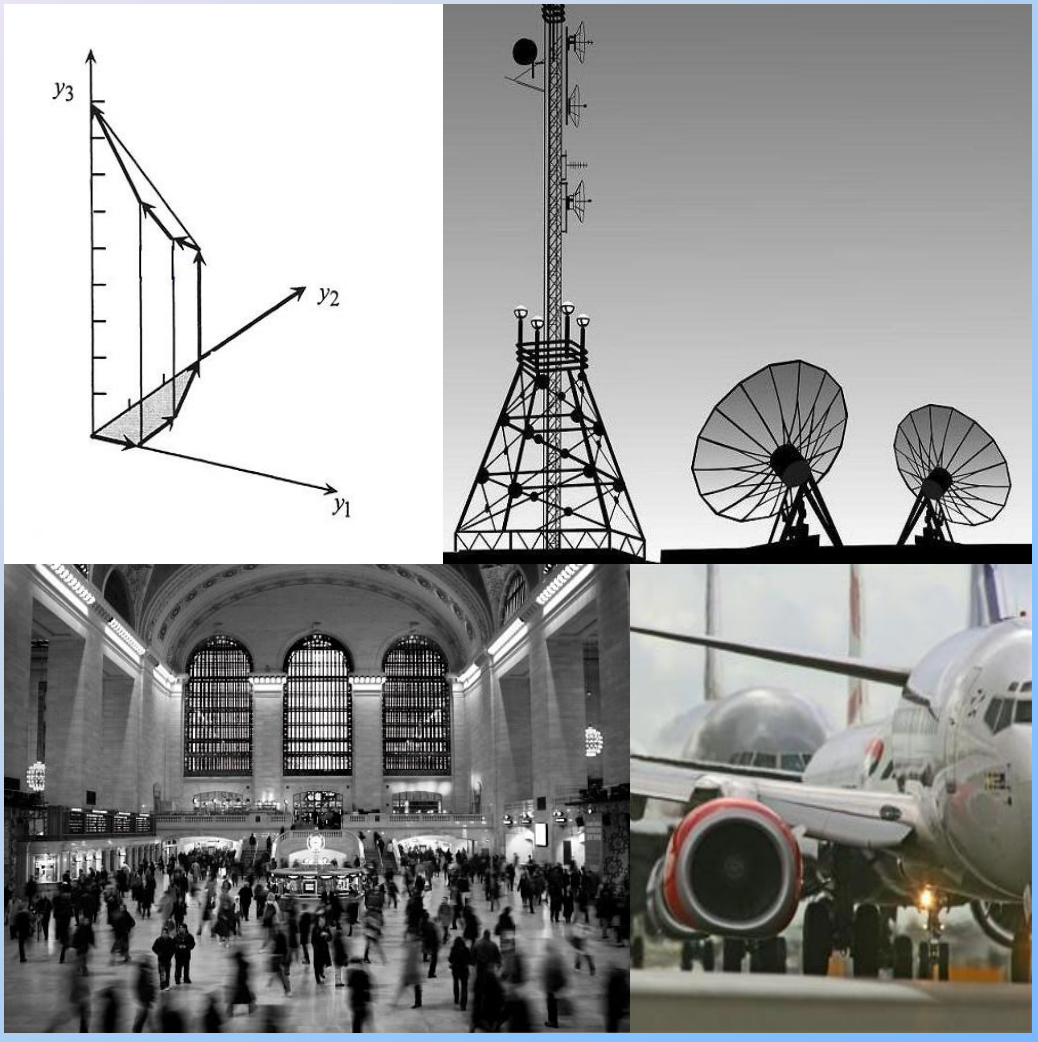
Operations Research



Applying mathematics to solve problems in industry

Engineering, business, finance, computer science, manufacturing, health care, . . .

Operations Research

Making better decisions in a complex world

Optimization; finding the best solution using limited resources

- Quickest time
- Shortest path
- Least cost
- Maximum profit
- Minimum waiting time

Operations Research

- A combination of mathematics, statistics and computing skills
- Learn mathematical methods to solve complex problems
- Experience working on real-world problems
- Report writing, group work, presentations

Operations Research:

- Financial planning
- Hospital utilization
- Vehicle routing
- Transportation
- Scheduling
- Logistics
- Management
- Quality control
- Policy analysis
- Resource management

Financial Planning

How should a company allocate funds to each of several projects over the next 5 years in order to maximize the expected return?

Transportation

Determine how to transport goods in a cost effective way.

Disease Treatment

Determine the dosage of radiation or chemicals to administer to a patient.

Scheduling

- schedule final examinations at a university

- schedule employees in a company

Queuing

What is the best way to staff a call centre?

How many tellers should be working in a bank?

How long will the line up be to get your car washed?

Hospital Utilization

How do we allocate patients and nurses to hospital beds?

How do we allocate transplant organs to people in need?

O.R. Grads Get Great Jobs!

Incredibly diverse opportunities:

- Information Technology
- Business/Systems Analysis
- Supply Chain/Inventory Analysis
- Operations Research
- Product Management
- Quality Assurance
- Accounting
- Intellectual Property Security
- Health Care
- Teaching
- Patent Law

This course will give you a (gentle) introduction to operations research (and analytics modelling), and give you a quantitative (Q) and writing (W) credit too!

Math 208W

Introduction to Operations Research

Spring

(prerequisite: Calculus I)

Core modelling courses in the O.R. Program:

Math 208W

Introduction to Operations Research

Spring

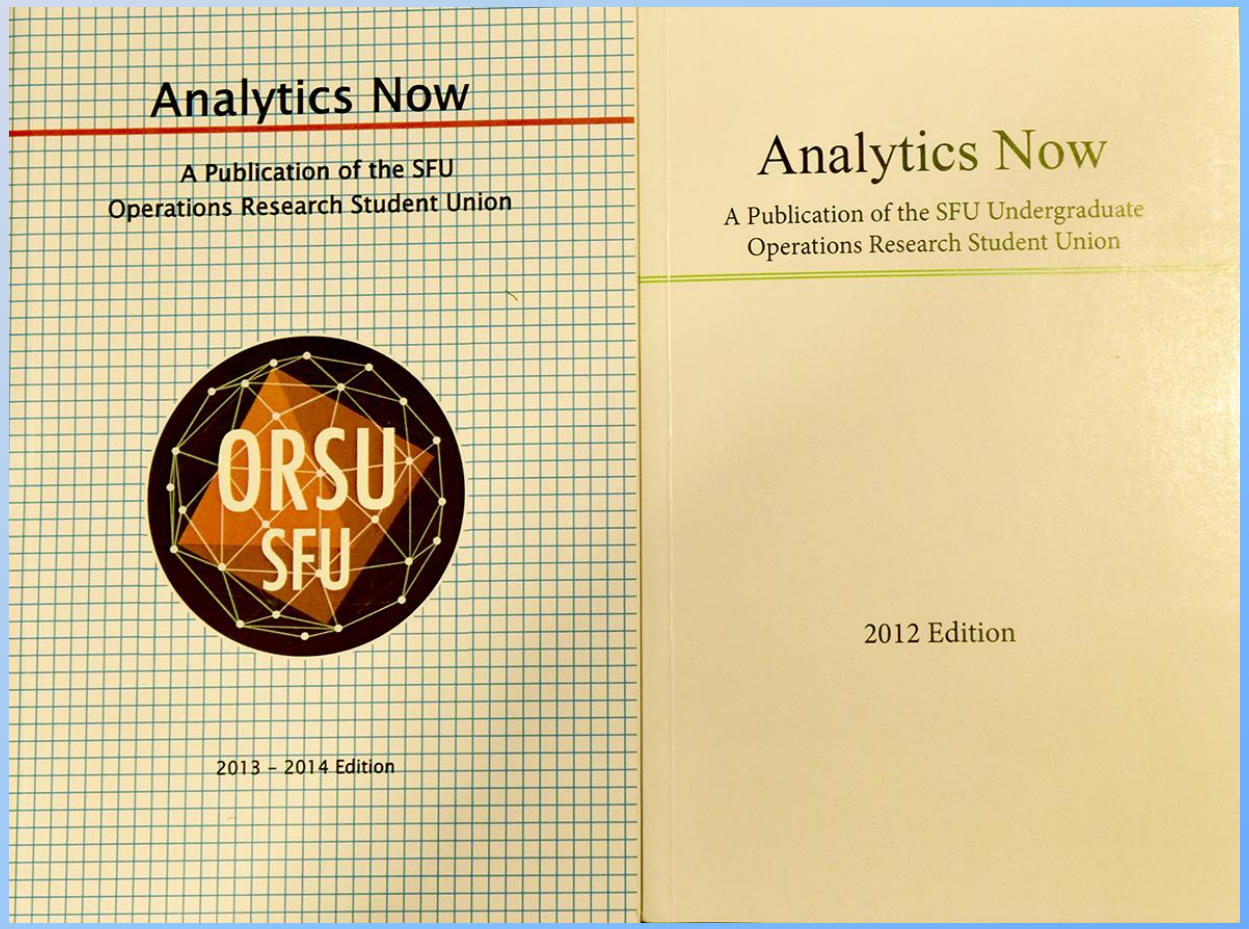
Math 402W

Operations Research Clinic

Spring

Core modelling courses in the O.R. Program:

Projects are published in the ORSU publication, *Analytics Now.* Copies are available in the math department at both campuses



SFU Operations Research students (Math 402W) win big at the CORS students paper awards; 2012, 2013, 2014!

Program Requirements

Operations Research

- 13+ mathematics courses
- 6+ statistics
- 3 computing science

Interdisciplinary requirement: 5+courses in: actuarial science, business, economics, resource and environmental management, mathematics, statistics, computing science

More details:

Lower division requirements:

MATH 150/151, 152, 208W, 251, 232/240
MACM 101, 201
STAT 270, 285
CMPT 126/128 or 120+125 or 130+135, 225

Upper division requirements:

MATH 308, 348, 402W
Four of: MATH 309, 408, 448, STAT 350, STAT 380
Plus 3 more MATH or STAT courses*

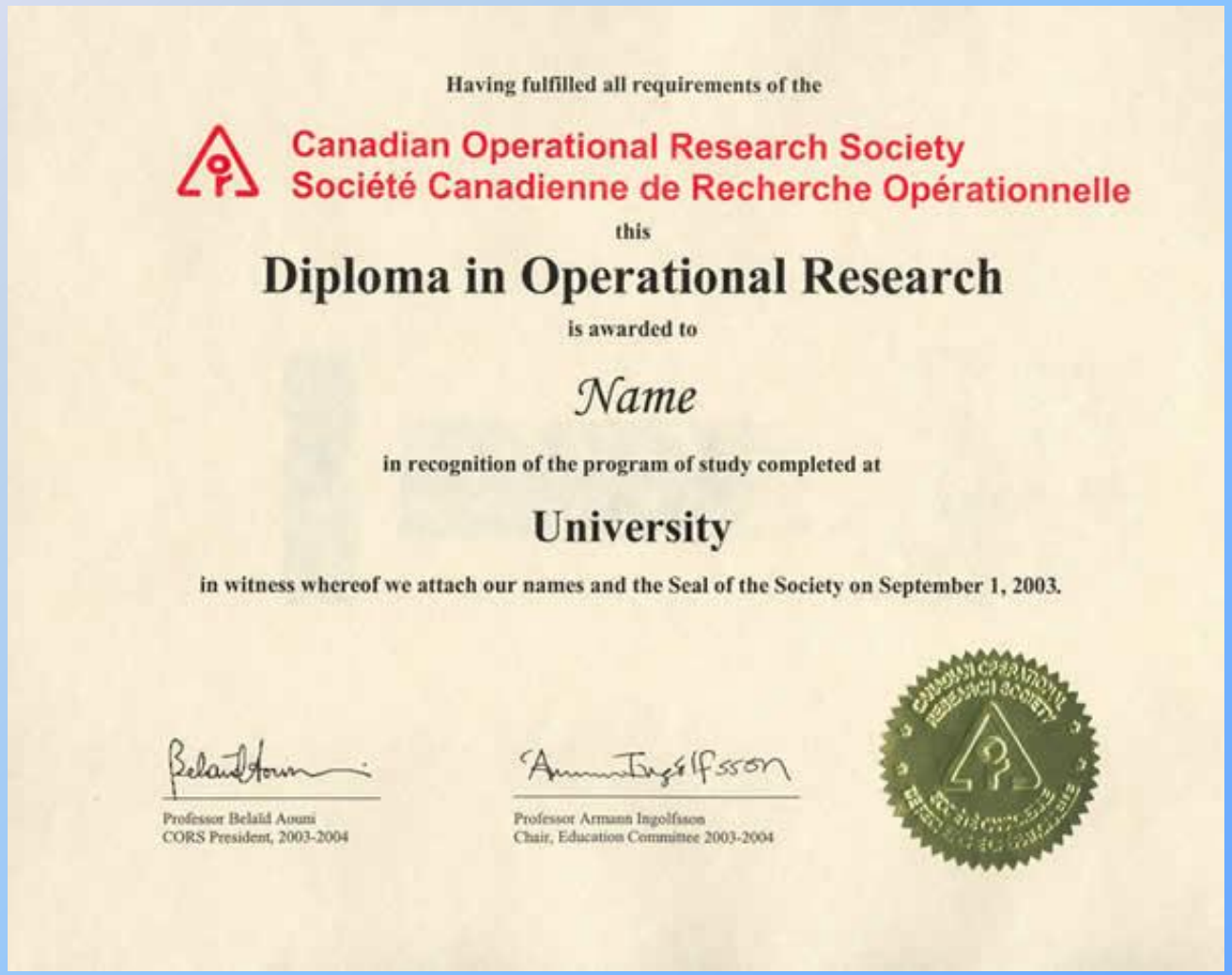
* See the SFU academic calendar for a listing of these courses

Program Requirements

Attention!

Some upper level math and stats courses are only offered once every two years, so O.R. students need to plan ahead! (Suggestion: take MATH 308 as soon as possible)

O.R. graduates are elegible for the CORS Diploma in Operations Research:



Having fulfilled all requirements of the

Canadian Operational Research Society
Société Canadienne de Recherche Opérationnelle

this

Diploma in Operational Research

is awarded to

Name

in recognition of the program of study completed at

University

in witness whereof we attach our names and the Seal of the Society on September 1, 2003.

Professor Belaid Aouni
CORS President, 2003-2004

Professor Armann Ingolfsson
Chair, Education Committee 2003-2004

Additional Information

Webpages:

http://www.sfu.ca/math → undergraduate → programs

http://www.surrey.sfu.ca
→ prospective students → academic programs → Operations Research

http://www.math.sfu.ca

Contacts: Randall Pyke (Operations Research advisor)
rpyke@sfu.ca

sfu.ca/~rpyke → After graduation: Information on careers…
(slides from presentations, video recordings, ….)