

A photograph of a modern, multi-story glass building at Simon Fraser University. The building has a curved facade and is surrounded by greenery, including large plants in the foreground and trees in the background. People are visible walking on the sidewalk in front of the building. The sky is blue with some clouds.

SFU

SIMON FRASER UNIVERSITY
THINKING OF THE WORLD

Industrial Mathematics BSc

Operations Research and Applied Statistics

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What is Industrial Mathematics?

(cf. www.sfu.ca/~rpyke/ind_math.html)

Industrial mathematics is a branch of applied mathematics that focuses on problems which come from industry* and aims for solutions which are relevant to industry, including finding the most efficient (i.e., cost-effective) way to solve the problem.

Industrial mathematics is an inherently *interdisciplinary* field. In addition to mathematics, it includes subjects from fields outside mathematics such as business, computer science and engineering, and trains mathematics students how to apply mathematical analysis to problems arising in these areas.

* manufacturing and service, including business and engineering, medical science, etc

Industrial Mathematics



**Applying
mathematics to
solve problems
in industry**

(engineering,
business, finance,
computer science,
manufacturing, ...)

Vancouver hosts the world's premier conference on industrial mathematics!

ICIAM 2011

International Congress on Industrial and Applied Mathematics



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www.iciam.org

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MITACS

Industrial Mathematics Program

Operations Research and Applied Statistics (ORAS)

Advisor: R. Pyke (rpyke@sfu.ca)
(Surrey)

ORAS Program Requirements

Lower division requirements:

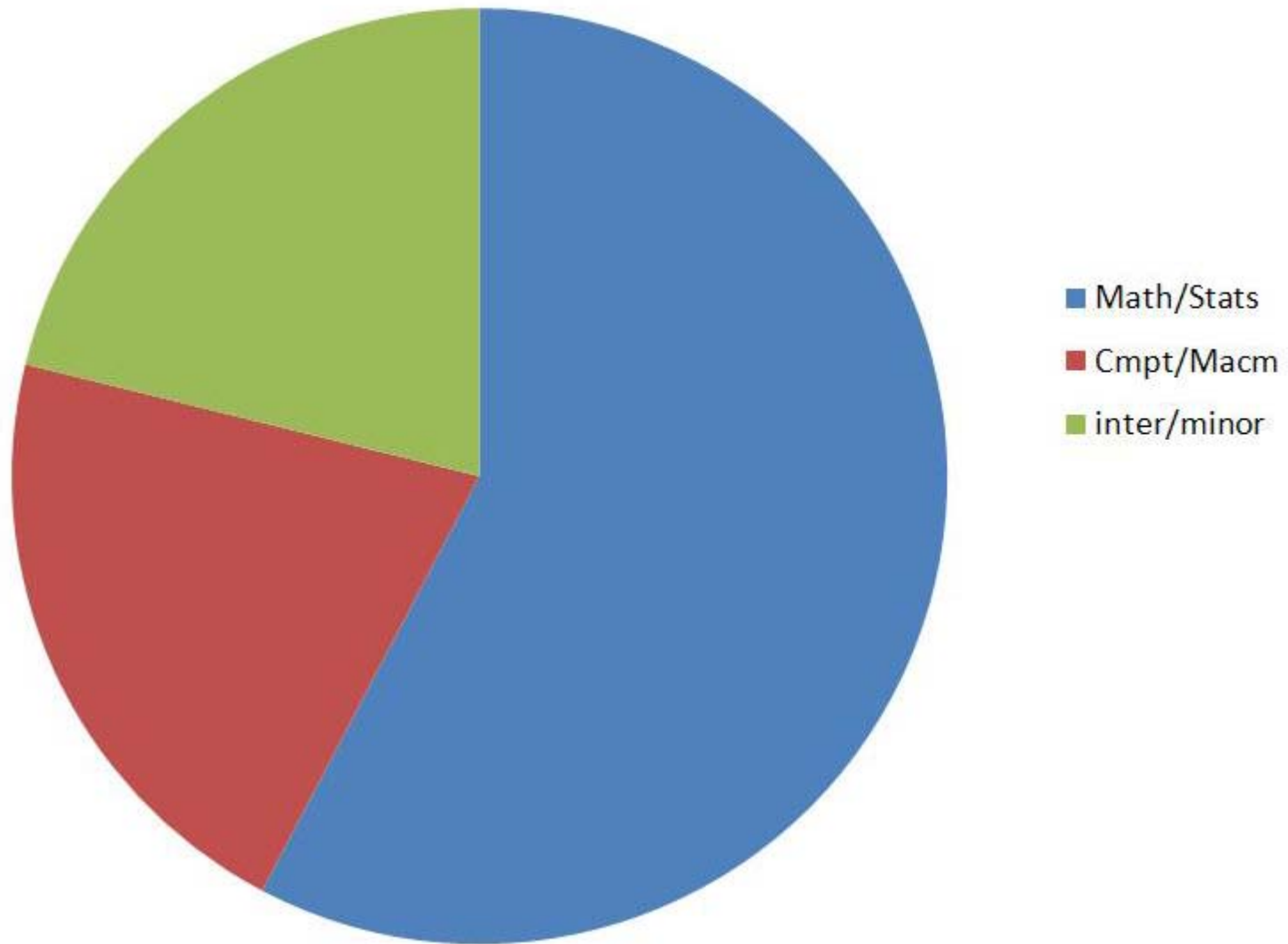
- 3 courses CMPT (120/125/225)
- 5 courses Math (101/151/152/240/251, MACM101)
- 2 courses Statistics (270/285)

Area requirements:

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

Interdisciplinary: 5+ courses in
ACMA,BUEC,BUS,ECON,MACM,MATH,REM,STAT

ORAS course work



Some key words in operations research

- optimization
- network analysis
- financial analysis, risk analysis
- data mining
- queuing
- scheduling
- transportation logistics
- quality control
- simulation and modelling
- applied probability

Industrial Mathematics has been used to. . .

- Help Ford to optimize the way it designs and tests vehicle prototypes, saving \$250 million.
- Allow UPS to redesign its overnight delivery network, saving \$87 plus and additional \$189 million over the following decade.
- Help NBC improve advertising sales plans, increasing revenues by over \$200 million.
- Design an intra-operative 3D treatment planning system for brachytherapy (the placement of radioactive "seeds" inside the tumor) that offers a much safer and more reliable treatment.
- Help design the hull of the Swiss "Alinghi" yacht which holds the America's Cup.

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
- Etc, etc.

ADDITIONAL INFORMATION

Operations Research and Applied Statistics BSc

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