

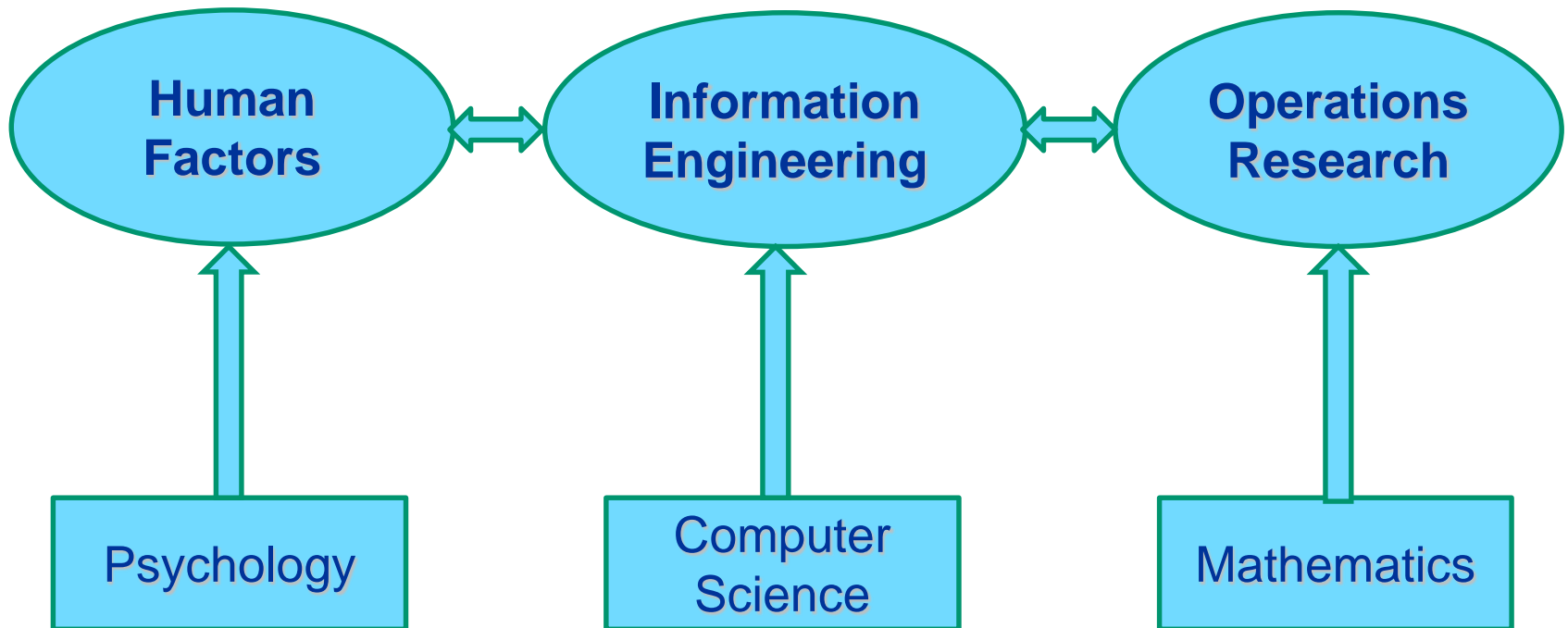
# IE Courses and Streams



Mechanical & Industrial Engineering  
UNIVERSITY OF TORONTO

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SCIENCE &  
ENGINEERING

# Industrial Engineering Streams



# Operations Research (OR)

- ~~What is operations research?~~
- What ISN'T operations research?



# Operations Research

- OR is everywhere!
- And so are OR careers



# Operations Research Areas



Supply Chain



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ENGINEERING



# Operations Research Areas



## Power Systems



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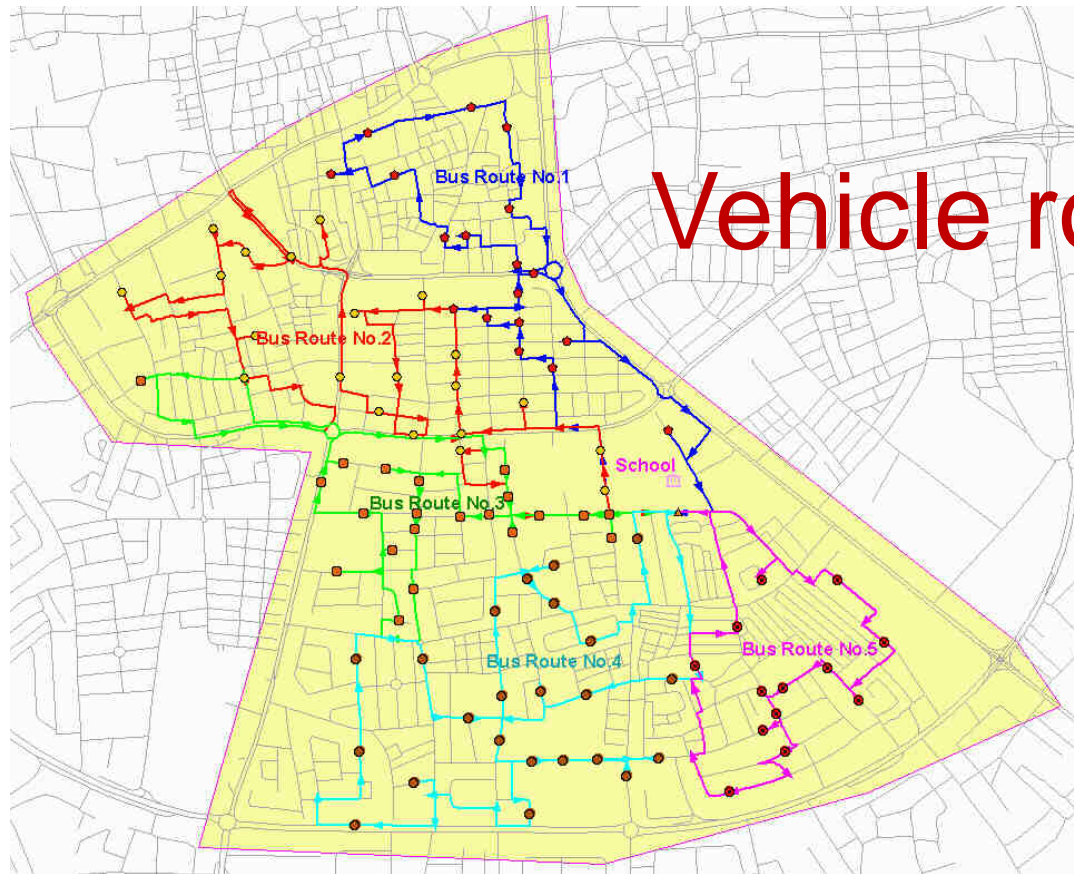
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# Power System Applications

- Supply Reliability
- Economic Dispatch
- Unit Commitment
- Maintenance Scheduling
- Asset Management
- Capacity Planning
- Operator Succession Planning



# Operations Research Areas



Vehicle routing





# Operations Research Areas



**Finance**



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# Operations Research Areas



Military



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# Operations Research Areas

Healthcare



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# Healthcare Applications

- Operating Room Scheduling
- Radiation therapy treatment
- Health Human Resources
- Facility Location
- Capacity Planning
- Patient Flow
- Blood Supply Management



# OR Core Courses

## Second Year

- **MIE250:** Fundamentals of Object Oriented Programming
- **MIE262:** Operational Research I: Deterministic OR
- **MIE263:** Operations Research II: Stochastic OR

## Third Year

- **MIE360:** Systems Modelling and Simulation
- **MIE335:** Algorithms & Numerical Methods
- **MIE363:** Resource and Production Modelling
- **MIE364:** Methods of Quality Control and Improvement





# OR Technical Electives

## Third Year

- **MIE365:** Operational Research III: Advanced OR
- **MIE354:** Business Process Engineering
- **MIE469:** Reliability and Maintainability Engineering
- **MIE367:** Cases in Operational Research

## Fourth Year

- **MIE562:** Scheduling
- **MIE566:** Decision Analysis
- **MIE561:** Healthcare Systems
- **MIE465:** Analytics in Action\*\*\*\*
- **MIE498H/Y:** Research Thesis\*



# Careers in Operations Research

- Manager, Business Strategy at **Air Canada**
- Missionary at Global Outreach Mission, Author of "On the Potter's Wheel"
- Consulting Executive - Technology Strategy Sr Manager at **Accenture**
- **Avenue Investment** Management
- Senior Manager, at **BMO** Financial Group
- **Google** Asia & Pacific Financial Planner and Analyst
- Director, Commercial & Supply Chain (Retail Division) at **Webcor** Group
- Consultant at **Avanade**
- Senior Consultant at **Capco**
- Healthcare IT Professional at **Carestream Health**
- Program Manager at **Enoro** (Finland)
- Health Policy and Management Specialist at **Cancer Care Ontario**
- Project Manager – Lean, Ontario Ministry of the **Attorney General**



# Operations Research Faculty

Michael Carter



Timothy Chan



Dionne Aleman



Michael Kim



Roy Kwon



Chi-Guhn Lee



Viliam Makis



Daniel Frances



Chris Beck



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# Graduate Studies for Operations Research

Want to be an Industrial Engineer? → Work for a while + MBA?

Want to be an Operations Researcher? → Grad school?

**M.Eng:** Professional development degree

- 10 courses or 7 courses plus a project

- 12 months full time or longer part time.

- Optional Certificates, e.g. Healthcare Engineering Certificate

**M.A.Sc:** Develop your research abilities

- 4 courses plus a research thesis

- 2 years is typical

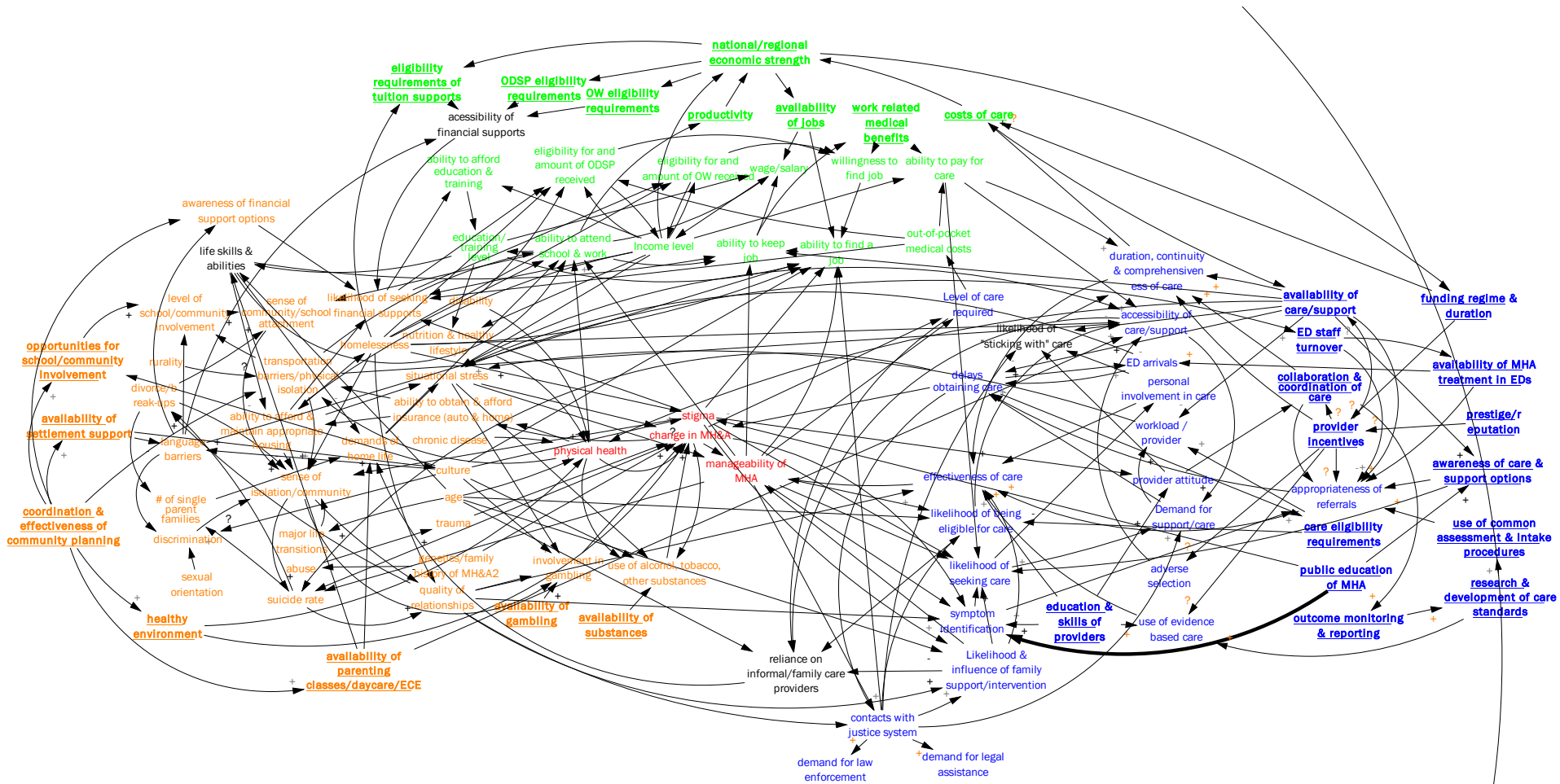
**Ph.D:** Looking for a career in research or teaching?

- 5 courses plus thesis

- 4 years is the target



# Model of the Ontario Mental Health System





This is a detailed electrical schematic diagram, likely for a power distribution system. The diagram is organized into a grid with labels for components and wiring. The top half of the diagram features a complex network of red lines, while the bottom half features green lines. The red lines represent a primary power distribution system, and the green lines represent a secondary or backup system. The diagram includes numerous components such as switches, relays, sensors, and control units, all interconnected by a dense web of lines. The diagram is labeled with various codes and numbers, including '1000', '1001', '1002', '1003', '1004', '1005', '1006', '1007', '1008', '1009', '1010', '1011', '1012', '1013', '1014', '1015', '1016', '1017', '1018', '1019', '1020', '1021', '1022', '1023', '1024', '1025', '1026', '1027', '1028', '1029', '1030', '1031', '1032', '1033', '1034', '1035', '1036', '1037', '1038', '1039', '1040', '1041', '1042', '1043', '1044', '1045', '1046', '1047', '1048', '1049', '1050', '1051', '1052', '1053', '1054', '1055', '1056', '1057', '1058', '1059', '1060', '1061', '1062', '1063', '1064', '1065', '1066', '1067', '1068', '1069', '1070', '1071', '1072', '1073', '1074', '1075', '1076', '1077', '1078', '1079', '1080', '1081', '1082', '1083', '1084', '1085', '1086', '1087', '1088', '1089', '1090', '1091', '1092', '1093', '1094', '1095', '1096', '1097', '1098', '1099', '1100', '1101', '1102', '1103', '1104', '1105', '1106', '1107', '1108', '1109', '1110', '1111', '1112', '1113', '1114', '1115', '1116', 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