

# PROFESSIONAL MASTER'S IN ENGINEERING

The Professional Master's in Engineering provides students with a premier curriculum. The program is a course-work master's and students will undertake dedicated courses, design projects, and a paid industrial co-op placement. The master's is designed to be completed in 16 months. Graduates of the Professional Master's in Engineering can apply to be an Engineer-in-Training in British Columbia.

## MECHATRONIC PRODUCT REALIZATION

### WHY MECHATRONICS?

Mechatronics is a multi-disciplinary engineering field that combines three areas of study: mechanical, electrical and computer engineering. Given the rapid growth of new information technologies, digital circuits and additive manufacturing technologies, the market for new mechatronic products is growing exponentially in all industry sectors, including consumer products and electronics, automotive, medical, industrial and aerospace.



### WILL I BE ABLE TO OBTAIN WORK EXPERIENCE DURING THE PROGRAM?

Yes, the program includes a four-month paid co-op placement and three lab courses in which students will work on projects for the industry. The average salary for the co-op placement is between C\$8,000-12,000 for the four-month period. Students in the School of Mechatronics Engineering have undertaken paid co-op placements with:

- Ballard Power
- Brock Solutions
- Affinity Manufacturing Ltd.
- Tesla Motors
- SNC Lavalin Inc
- Karidum Inc
- Weir Jones Engineering
- Cogent Industrial Technologies
- Kodak
- Grantek Systems Integration
- Singer Valve
- Tolko Industries
- SpaceX

Undertaking co-op and projects for companies means you will have the opportunity to forge strong links with potential employers.

### CAN I QUALIFY AND BECOME AN ENGINEER IN CANADA AFTER TAKING THE PROFESSIONAL MASTER'S?

Graduates of the Professional Master's in Engineering who have previously graduated from a four-to five-year university level undergraduate engineering program in a directly related discipline of engineering (mechanical, electrical/electronic, manufacturing or mechatronic engineering) would be considered to be academically qualified for registration as an Engineer-in-Training in British Columbia.

To obtain the status of professional engineer (P.Eng.), graduates will need to work for four years under the supervision of a professional member of the Association of Professional Engineers and Geoscientists of British Columbia and complete the Law and Ethics Seminar and the Professional Practice Exam.

Co-op experience obtained during the master's can be credited towards the required work experience for registration as a professional engineer, subject to certain requirements.

### WHICH AREAS OF ENGINEERING CAN I WORK IN WITH THIS QUALIFICATION?

There are great opportunities in mechatronics engineering, you will also be able to apply to work in the areas of mechanical or electrical engineering depending on your first degree.

# WHY SIMON FRASER UNIVERSITY?

Simon Fraser University (SFU) is consistently ranked among the top ten universities in Canada. The university prides itself on innovative programs with a focus on academic excellence. SFU has three campuses in the greater Vancouver area and over 25,000 students. Vancouver is a great place to study and is consistently ranked as one of the top five most liveable cities in the world.

## WHY TAKE THE FIC PRE-MASTER'S PROGRAM (PMP) IN ENGINEERING?

The 13-week PMP in Engineering at FIC\* is designed to successfully prepare students for the challenges of studying in the Professional Master's in Engineering Program at one of Canada's top universities. FIC's small class sizes result in students receiving extensive support and additional personal attention from instructors. Due to the comprehensive foundation available within the PMP in Engineering, the IELTS requirement is slightly lower than the requirement for direct admission to the Professional Master's in Engineering Program.

Successful applicants will receive a combined Letter of Offer for the PMP in Engineering at FIC and the Professional Master's in Engineering Program at SFU. Transfer to the Professional Master's in Engineering Program is guaranteed upon completing the PMP with a GPA of 3.0.

## WHAT ARE THE ADMISSION REQUIREMENTS FOR THE PMP IN ENGINEERING?

- Bachelor's degree in Mechanical Engineering, Electrical Engineering, Mechatronic Engineering, Engineering Science or a related field with a cumulative grade point average (GPA) of 3.0 (on a scale of 0.0-4.33) or equivalent
- IELTS 6.5 (with no band below 6.0) or equivalent

## TUITION FEES

- PMP in Engineering, C\$14,210
- Professional Master's in Engineering Program, C\$31,824
  - Please note the program includes a four-month paid co-op term where salaries average between C\$8,000-12,000

## INTAKE DATES

- 24 May for FIC PMP progressing to SFU Master's Program in September 2016

\* subject to final approval by the Senate Graduate Studies Committee



# PROGRAM STRUCTURE

## PRE-MASTER'S PROGRAM (PMP) IN ENGINEERING

During the four-month PMP, students will study the following subjects:

### Communication Skills: Practical and Intercultural Issues

To be successful in their careers and in graduate study, students require effective communication skills. It is also important to be able to transfer and adapt current skills to new situations. This course provides an opportunity for students to improve the communication skills that are important to graduate study in the context of a Canadian university. It explores communication through the intercultural domain, meaning that it helps students to build on and extend their current intercultural skills, while ensuring that they are equipped to respond appropriately in the varied and multicultural environments they will experience in Canadian graduate studies. During the course, students will work individually and in teams to improve their verbal, non-verbal and written communication skills.

### Introduction to Quantitative Business Analytics: Statistics and Engineering Economics

Today's engineers must have a basic understanding of the economic reality of the world they work in as well as basic business practices to succeed in their careers. In this course, students will be introduced to core concepts in financial accounting, designed to help students understand the "language of business". This will include understanding the purposes of the financial statements that firms use to describe and analyse the financial state of their operations, how to construct these financial statements, and some simple ratios that capture key elements of firm performance. After completing the course, students should be able to understand many of the fundamental financial accounting issues and challenges faced by managers today. The Business Statistics module aims to give students a foundation in fundamental statistics knowledge, covering basic concepts such as distributions, standard deviations, correlations, and regression analyses. The Engineering Economics module will provide a sound introduction to key concepts in this important field.

### Introduction to Collaborative Work Environments

In order to succeed in today's world, professionals must be able to work collaboratively with others. This often requires that they learn to work with people from different countries with different cultures, customs, and expectations. Further, given the nature of the PMP in Engineering, students must work effectively with others in order to succeed in the program. In this course, participants will develop their ability to work collaboratively in a team-based environment.

### Academic Literacy in Context: Business & Technical Writing

This course will prepare students for the rigor and requirements of academic writing at the graduate level with a technical focus. It will make students aware of and competent in all aspects of business and technical writing, including memos, reports, briefings and pitches. Students will practice brainstorming, outlining, researching, drafting, revising, and presenting finalized written work. They will learn to use data to support their ideas and express opinions with confidence. In this course, students must be highly engaged and prepared to interact in group discussions and peer-review as well as work independently to complete larger assignments outside of class time.

### Product Realization Capstone

This capstone course will provide a practice ground for students as they begin to explore the importance of product realization. This course will allow students to practice their skills in a supportive environment, and then present in a realistic setting. Students will have the opportunity to put all the theory they learn in the PMP in Engineering to practice by becoming part of a high-functioning cross-cultural team as they work together to create a functioning prototype. By engaging in this course, students will learn effective time management and presentation skills, and be able to confidently introduce their product while making sound recommendations backed up with careful research and analytics.

## PROFESSIONAL MASTER'S IN ENGINEERING: MECHATRONIC PRODUCT REALIZATION

Offered by the School of Mechatronic Systems Engineering at Simon Fraser University, this 16-month Professional Master's Program provides students with a premier curriculum—through dedicated courses, design projects, and industrial co-ops—to stay competitive in product design and manufacturing.

### Total: 30 units

These units are divided into three main sections: 15 units of graduate course work; 12 units of specialized lab and project work; and 3 units for co-op.

### Graduate course work: 15 units

At least two (2) courses or six (6) units from:

- MSE 726-3 Introduction to Engineering Design Optimization
- MSE 727-3 Finite Element Analysis, and
- MSE 780-3 Manufacturing Systems

The remaining units from the following courses:

- MSE 801-3 Research and Publication Methods
- MSE 900-3 Engineering in the Canadian Context, and
- Any other technical graduate courses offered from MSE

### Lab Courses: 12 units

- MSE 995-6 Advanced Modeling and Prototyping
- MSE 921-3 Product Realization Project I
- MSE 922-3 Product Realization Project II

### Co-Operative Education: 3 units

MSE 793-3 Graduate Co-op

PRE-MASTER'S  
AT FIC  
4 months

PROFESSIONAL MASTER'S  
AT SFU  
16 months

ENGINEER IN TRAINING  
4 years

PROFESSIONAL  
ENGINEER

# SFU FACULTY MEMBERS

## PROFESSIONAL MASTER'S IN ENGINEERING

All faculty members currently work with industry partners in product design and development and in collaborative research projects.

### Advanced Modeling and Prototyping: Krishna Vijayaraghavan

CAD modeling, reverse engineering, additive manufacturing, basic machining, and other hands-on skills are fundamentals to the product realization process. Professor Vijayaraghavan and our experienced machinists show the process of ideation, modeling, rapid prototyping, and reverse engineering.

### Finite Element Analysis:

Carolyn Sparrey, Siamak Arzanpour, Gary Wang

Finite Element Analysis (FEA) is a modern computation method that is widely used in product analysis and design. Professors Sparrey, Arzanpour and Wang have extensive experience and knowledge in this area and actively apply FEA in their research as well.

### Design Optimization:

Gary Wang

Design optimization and automation are growing in importance as FEA and other computational methods are more widely used. Professor Wang is an internationally recognized researcher in this area. His Product Design and Optimization Laboratory (PDOL) combines knowledge from multiple disciplines to advance product development

methods and optimize designs. His group is developing breakthrough products or processes in collaboration with varied industrial partners.

### Manufacturing Systems:

Kevin Oldknow, Ed Park

Professors Oldknow and Park provide rich knowledge and techniques in advanced manufacturing systems. Manufacturing is crucially important to product realization. The new generation of product design engineers should be well-versed in the entire product realization process, spanning from ideation and design to manufacturing.

### Research and Publication Methods:

Maureen Hindy

Professor Hindy, a communications expert and lawyer, brings unique expertise to the program. She ensures students are well-versed in effective communications, application of ethics, relevant codes and laws, and the understanding of their role in society and the market.

### Engineering in the Canadian Context:

Kevin Oldknow

Professor Oldknow has years of experience as an executive member of a private company and maintains ties with the rapidly changing manufacturing industry. He focuses on skills needed to practice engineering in Canada, including engineering economics, standards and codes, law and ethics, as well as project management.

### Product Realization Projects:

Farid Golnaraghi

Product realization projects enable students to work on real-life applications, in collaboration with industry and academic sponsors. Professor Golnaraghi has successfully led numerous similar projects with industry partners. He was Canadian Research Tier I Chair, as well as SFU Burnaby Mountain Research Chair, and is currently the school Director.

## HOW TO APPLY

An online application should be made on the following webpage:  
[fraseric.ca/apply](https://fraseric.ca/apply)



**SEIZE THE OPPORTUNITY – APPLY NOW ONLINE**  
[fraseric.ca/apply](https://fraseric.ca/apply)

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