Department of Mechanical Engineering

University of Saskatchewan

Graduate Student Handbook

September 2019

Contents

1 Introduction

The graduate programs in Mechanical Engineering have a long history with the MSc program being established in 1933 and the PhD program in 1959. The Department is proud of the many graduates of these programs that have gone on to achieve success in academia and industry. We hope that this handbook is helpful to our current graduate students. Suggestions for improvements should be directed to the Chair of the Graduate Studies Committee.

2 Purpose

This handbook is intended to bring together several policies and procedures that have been developed over the years for the graduate program in Mechanical Engineering. It is important to note that these policies and procedures are not a replacement for policies and procedures developed by the College of Graduate and Postdoctoral Studies (CGPS). Instead, they are meant to supplement those procedures and provide program-specific clarification of procedures that may be quite general at the CGPS level.

The Graduate and Postdoctoral Studies Policies of CGPS can be found at http://www.usask.ca/cgps/policy-and-procedure/index.php and will be referred to as CGPS Policies in this handbook.

Some general information on interest to current students in the Mechanical Engineering graduate program is also included in Section 3.

3 General Information

The information contained here is of interest to current graduate students in the Department of Mechanical Engineering. For further information, students should contact their supervisor, the Graduate Assistant or the Graduate Chair.

Many pieces of general information for graduate students can be found on the University of Saskatchewan website. Students are encouraged to visit this page for information on a number of important topics, including:

- Academic and other support services,
- Classes and registration,
- Exams and grades,
- Library resources,
- Mental and physical health services (including the Physical Activity Complex and Student Wellness Centre),
- Program completion and Convocation,
- Scholarships and tuition,
- Student Learning Services (including study skills workshops, and resources to assist in writing papers, reports and your thesis), and
- Workshops and other resources to support teaching and professional skill development.

This site also includes links to general information to assist students in getting settled after their arrival in Saskatoon.

Advisory Committees

All M.Sc. and Ph.D. students have an Advisory Committee. A M.Sc. Advisory Committee consists of a student's supervisor(s) and two other faculty members, who are typically also from the Department of Mechanical Engineering. A Ph.D. Advisory Committee consists of a student's supervisor(s) and three other faculty members, at least one of which (the Cognate Member) is from another department on campus. An Advisory Committee meeting is scheduled at least once each year to evaluate the student's progress. Any member of the Advisory Committee, as well as the student, can also request a meeting of the Advisory Committee.

Arrival Information

Students are encouraged to consult the International Student and Study Abroad Centre (ISSAC) website for important information on the University, as well as getting settled in Saskatoon.

Computer Support

Information Technology Services provides computer hardware and software support to students, faculty and staff within the University of Saskatchewan. Assistance can be obtained through the Peter Nikiforuk Innovative Teaching and Learning Centre (room 2B06), or ICT Services and Support. The University also sells computer hardware and software through:

- Shop usask Tech (personal purchases, located in the Main Bookstore), and
- IT Acquisitions (purchases charged to university funds, located in Room 38 of the Education Building).

Additional information on computer labs, printing and software for engineering students can be found on the College of Engineering's website.

Confirmation of Enrolment and Completion of Degree Letters
Confirmation of Enrolment letters can be requested through the Registration channel in PAWS. Completion of Degree letters can be requested from the College of Graduate and Postdoctoral Studies.

Courses and Registration

Courses
The department offers graduate-level (800-numbered) courses primarily during the Fall (September - December) and Winter (January - April) terms. A few graduate courses may be offered during the Spring/Summer term (May - August).

Graduate program requirements and graduate course descriptions can be found in the University's Course and Program Catalogue. Not all courses listed in this Catalogue are offered in a given academic year. Students can find the courses that will be offered each year on the course offerings portion of the University website.

M.Sc. and M.Eng. students are also permitted to take senior undergraduate courses as part of the required coursework for their degrees. With permission of their Supervisor(s) and Advisory Committee, M.Sc. students may take one senior undergraduate course (i.e., 3 credit units) as part of their five required courses (15 credit units), while M.Eng. students may take up to two senior undergraduate courses (6 credit units) as part of their eight required courses (24 credit units). Please see the Course and Program Catalogue entry for our department's undergraduate program for further information on senior undergraduate courses. Students should note that some of these courses may have specific prerequisites and registration limits.

Registration
The University's Student and Enrolment Services Division are responsible for registration and fee assessment for graduate students, in partnership with the College of Graduate and Postdoctoral Studies.

All graduate students must register for courses through PAWS. However, students must first obtain a Graduate Class Permission Form, have this form signed by both their course instructors and supervisor, and return it to the Graduate Assistant. No approval is needed to register for ME 990, ME 992, ME 994, and ME 996. Registration deadlines for each term are listed in the UofS Academic Calendar.

Graduate students who do not maintain their registration may be Required to Discontinue (RTD) from their program as per the College of Graduate and Postdoctoral Studies' policies.

Besides graduate courses taken for credit, graduate students must register for the graduate seminar course (ME 990) and a thesis or project course (ME 992 or ME 994 or ME 996). Please see the table below for more information as to which terms students must register for these courses.

Program	Term 1 (Sept – Dec)	Term 2 (Jan – Apr)	Spring/Summer (May – Aug)
M.Eng.	Courses ME 990 ME 992	Courses ME 990 ME 992	ME 992
M.Sc.	Courses ME 990 ME 994	Courses ME 990 ME 994	ME 994
Ph.D.	Courses ME 990 ME 996	Courses ME 990 ME 996	ME 996

GSR 960, GSR 961, GSR 962

All graduate students are required to complete GSR 960 (Introduction to Ethics and Integrity). Students must also complete GSR 961 (Ethics and Integrity in Human Research) or GSR 962 (Ethics and Integrity in Animal Research), if their thesis research involves human or animal subjects.

Auditing Classes

Auditing a class is only permitted in special circumstances and must be approved by a student's Advisory Committee as part of their Program of Studies. To be eligible to audit a class, the student must submit a Permission to Audit and/or Change of Audit/Credit Status Form; this form must be signed by the Instructor and the Graduate Chair

Defence

M.Sc. and Ph.D. students must successfully complete an oral defence of their thesis. Information on procedures for the oral defence is available on the College of Graduate and Postdoctoral Studies's website. Additional information on the preparation of graduate theses in our department can be found below under "Theses".

Department Offices

The Department of Mechanical Engineering main office is located in Room 3B48 of the Engineering Building. The Graduate Assistant is located in room 2B60.

E-mail

The University of Saskatchewan provides e-mail service to all students, in the format of the student's NSID + @mail.usask.ca (such as abc123@mail.usask.ca). The University of

Saskatchewan uses this e-mail service for official communications with students. Current students should note that all e-mail communications from the College of Graduate and Postdoctoral Studies, and from the Department of Mechanical Engineering, will be sent to their @mail.usask.ca addresses only. It is the account holder's responsibility to ensure that e-mail received at his/her official University address is attended to in a timely manner.

Further information is given in the University's Policy on Electronic Mail.

Engineering Library

The Engineering Library is located within the Engineering Building, making it easily accessible to graduate students. Students are encouraged to contact the Engineering Library at any time to arrange individual or group instruction on how to make use of the library's resources. Sessions are also held throughout the year in the Engineering and Main Libraries on a variety of topics of interest to graduate students.

Graduate Assistant, Graduate Chair and Department Head

Graduate students who have questions about their programs should first contact their supervisor. Your supervisor may be refer you to the Graduate Assistant, Graduate Chair, Department Head or College of Graduate and Postdoctoral Studies.

The Graduate Assistant can assist you with your questions about registration and department policies and procedures. The Graduate Assistant is also responsible for managing the day-to-day operation of the graduate program (e.g., graduate student desks), maintaining student files, processing applications, and setting up advisory committee meetings and thesis defences.

The Graduate Chair can assist you with your questions about your academic program. The Graduate Chair directs the graduate program, chairs the department's Graduate Studies Committee, represents the department's graduate program at Graduate Council and within the College of Engineering, sets policies and procedures, and approves recommendations for admissions, transfers, extensions, awarding of degrees and scheduling exams and defences. These recommendations are forwarded to the College of Graduate and Postdoctoral Studies for approval.

The Department Head is responsible for the overall administration of the Department of Mechanical Engineering.

Graduate Student Organizations

All graduate students are automatically members of the University's Graduate Students Association (GSA) and the Engineering Graduate Community Council (EGCC). More information on the GSA's and EGCC's services and activities can be found on the GSA and EGCC websites.

International Student and Study Abroad Centre (ISSAC)

The International Student and Study Abroad Centre provides assistance and support to

international graduate students and their families. They can assist graduate students who have questions about immigration, housing, finances and accessing University services. The ISSAC is located in the lower level of Place Riel. More information is available on the ISSAC website.

Mailboxes
Mailboxes for graduate students are located in Room 2B60. Students should check their mailbox regularly.

ME 990 Graduate Seminar
All mechanical engineering graduate students in a degree program must register in the ME 990 Graduate Seminar course, and are required to attend and to participate in the discussions. M.Sc. students are required to give one ME 990 seminar during their program, while Ph.D. students are required to give two ME 990 seminars during their program. Ph.D. students may receive credit for one of their two ME 990 seminars by presenting a paper at an external research conference.

Besides student presentations, a number of lectures on various topics of importance to graduate students are given each year. Students in the first 12 months of their program must attend these lectures and complete assignments to receive credit for ME 990.

Information on the seminar program will be sent by email to graduate students at the beginning of the Fall and Winter terms. The Department of Mechanical Engineering presents annual Seminar Awards for the best graduate student seminars.

Office Space and Keys
Graduate student office space is available in research labs (desks are assigned by a student's supervisor) or in centrally-managed office space. New students need to request a desk through the Graduate Assistant. As there are a very limited number of desks available, students may not get a desk for the first several months of their program. Forms for requesting building and laboratory keys are available through the department office in 3B48. Please note that students must complete the College's Orientation Check List before any key requests can be processed.

Social Insurance Number, Study Permit and Other Documents
All Students who will be receiving financial support (e.g., Stipends, Scholarships, or Teaching Assistant positions) must apply for a Social Insurance Number (SIN) card.

It is **the student's responsibility** to ensure that their Study Permit, Social Insurance Number card, Passport and any other paperwork remain valid during their **entire** graduate program. Students should apply for renewals several months in advance and must not let these documents expire or their immigration status may be in danger. Each time one of these documents is renewed, students must bring a copy to the department office so that a copy can be placed in your file and a copy can be sent to Human Resources to keep their file current. This is very important.

Thesis

Preparing Your Thesis

When preparing your thesis, please refer to the guidelines for thesis preparation, organization, and formatting and style provided by the College of Graduate and Postdoctoral Studies. Further information can be found on the Electronic Theses and Dissertations (ETD) portion of the University website.

Your Supervisor(s) and Advisory Committee may also have some recommendations on the organization, format and style of your thesis, which should be communicated to you when you are given approval to begin writing your thesis.

Both the traditional thesis format and the manuscript-style thesis format are permitted in our department. Please note that as students must obtain the permission of their Advisory Committee to use a manuscript-style thesis format, students should discuss this possibility with their Advisory Committee as early as possible in their program. Further information on requirements and guidelines for manuscript-style theses can be found on the College of Graduate and Postdoctoral Studies site.

Submitting Your Thesis

The College of Graduate and Postdoctoral Studies requires all M.Sc. and Ph.D. students to submit an electronic thesis or dissertation (ETD). While not required, M.Eng. students may also submit approved project reports. Please note that while not required by the Department or College, supervisors may still require a bound copy of a thesis.

Provision can be made to restrict access to a thesis for a particular length of time if requested and agreed to by both the student and the supervisor.

Thesis Databases

The University of Saskatchewan Library maintains a fully searchable database of electronic theses and dissertations. Theses from the UofS and other Canadian universities can be found on the Theses Canada (Library and Archives Canada) website.

4 Safety

4.1 Introduction

Safety is a critical aspect of all activities in the Department of Mechanical Engineering. All activities in the department must be conducted with safety foremost in mind. If you have any questions at all about safety issues, please talk to your supervisor, the departmental assistant in charge of your laboratory area, or the Graduate Chair.

4.2 Safety Training and Orientation

All graduate students require proper training on any equipment that they use in their programs. Three safety training courses are compulsory for every graduate student – *Laboratory Safety, WHMIS* and the *Safety Orientation for Employees*. The first two of these courses are online, while Safety Orientation for Employees is an in-class course. These three courses MUST be successfully completed within the first four months of the student's program. To register in these courses visit the Safety Resources website at http://safetyresources.usask.ca/services/training/index.php.

In addition to these three courses, other task-specific safety training may be specified for each graduate student. This training may be offered by Safety Resources or arranged by faculty or departmental assistants.

Required safety training is specified in the Orientation Check List that each student must complete when they arrive on campus. This check list also includes lists of expectations for students and individual lab orientations. No key requests will be accepted unless a completed Orientation Check List is attached to the key request form.

At the end of their program, students must also complete an Exit Form, that signifies that they have returned their equipment and library books, cleaned their lab and office work areas, returned their computer and keys, and properly disposed of any hazardous materials and chemicals used in their research. This form must be signed by the student's faculty supervisor, lab manager(s), librarian, and computer facilities manager.

4.3 Safety Resources and Standard Operating Procedures

There are three main safety resources available online to Graduate Students:

- University of Saskatchewan Safety Resources (includes training course registration, procedures and guidelines, hazardous waste disposal forms, incident reporting) http://safetyresources.usask.ca/index.php

- College of Engineering Safety and Security (includes building emergency response procedure; working alone/after hours policy, Local Safety Committee information; orientation, exit and key request forms) – this can be accessed through the College's website: http://engineering.usask.ca

- Mechanical Engineering Safety Page (includes department-level, general and laboratory-specific standard operating procedures, and safety-related and contact information for each research area) – this can be accessed through the Department's home page: http://engineering.usask.ca/mech

All graduate students are required to read, understand, and sign the *Department of Mechanical Engineering General Requirements* standard operating procedure (ME0001). An unofficial copy of this SOP can be found on the Mechanical Engineering Safety Page under "Required Training Prior to Laboratory Usage", the official hard copy is located in 3B48 and can be accessed for acknowledgement at the Mechanical Engineering office.

In addition to this general SOP, many laboratory-specific SOPs exist which must be read, understood, and signed before keys are issued to a laboratory and before any work is performed using the equipment.

4.4 Department Safety Committee

The Department has a standing Safety Committee which meets once per month to discuss safety issues in the laboratories. The committee is chaired by the Department Head. All Departmental Assistants are permanent members of the committee. Two faculty members each serve three-year terms. There are two graduate students on the committee who each serve eight-month terms.

The Safety Committee performs inspections of all laboratories in the department. Inspections are done every month on a rotating basis so that each laboratory is inspected twice per year. The results of these inspections are discussed at the monthly safety meetings and action items are recorded in the minutes to formally record required corrective actions and assign responsibility to an individual.

5 Academic Integrity

Academic integrity in research and scholarship is a core value of the graduate program in the Department of Mechanical Engineering. The University of Saskatchewan's policies on academic integrity are described on the university's Academic Integrity Website.
New Mechanical Engineering graduate students must sign a Declaration of Academic Honesty (Appendix A) before beginning their graduate program. By signing this declaration, students are also signifying that they have read and understood the following documents (links to these documents can be found on the Declaration):

- the university's definitions of Academic Integrity and Academic Misconduct,
- the Principles and Responsibilities for researchers, as outlined in the Tri-Council Policy Statement: Integrity in Research and Scholarship (TCPS-I), and
- the Association of Professional Engineers & Geoscientists of Saskatchewan (APEGS) Code of Ethics (Section 20 of the Geoscience Professions Regulatory Bylaws, which can be found on the APEGS website under "About Us").

The University of Saskatchewan and the College of Graduate and Postdoctoral Studies (CGPS) have clear guidelines, policies and procedures for dealing with cases of academic misconduct. Information on these policies can be found at the following website.

- http://www.usask.ca/secretariat/student-conduct-appeals/

6 Graduate Student Admissions

6.1 Principles

The graduate student admission policies for the Department of Mechanical Engineering are based on the following principles.

- The department's goal is to admit high quality students to our graduate programs.
- The department's admission requirements are designed to ensure that applicants who are admitted have the potential to successfully complete a graduate program.
- The department will evaluate applications in as fair a manner as possible. This is especially important given the wide range of grading systems used in institutions from which applicants will have completed their previous degrees.
- The department will ensure that applicants are only accepted into a graduate program if they can be provided with adequate mentorship and supervision for their program.
- The department will practice strategic enrolment management for each of our graduate programs to ensure that the necessary resources are in place for applicants that are accepted. It is expected that the department will not be able to admit all applicants who meet the minimum admission requirements.
- The department aims to admit MSc and PhD students that are funded at a minimum level. Admission of students with funding less than the minimum may be considered in special cases when justified by the supervisor.

6.2 Minimum Admission Requirements

The CGPS Policies note that all applicants must meet minimum admission requirements based on their previous coursework, and must provide evidence in the following skill/ability areas:

- Discipline/field preparedness determined by the degree requirements, level of the previous degree completed and the coursework completed as part of previous degrees and academic study;
- Ability to do higher level academic study;
- Ability to do advanced research and individual study; and
- Ability to do academic study and research in English.

General admission requirements for all of the department's graduate programs are listed below, along with specific requirements for each individual graduate program.

<u>General Admission Requirements for All Mechanical Engineering Graduate Programs</u>

Supervisor

- An applicant cannot be admitted into any of the department's graduate programs

unless a faculty member agrees to supervise their graduate program.

English Language Proficiency

- Applicants must provide proof of English proficiency, unless they have completed a postsecondary degree program in English in Canada, or in a country or institution designated by the CGPS as one from which students do not need to provide proof of English proficiency. A list of these countries and institutions is maintained by the CGPS on their website. The CGPS may also require that an applicant has spent a minimum number of years of study in a country or institution before they are exempt from having to provide proof of English proficiency.
- Applicants who are required to provide proof of English proficiency must achieve a score that meets the minimum requirements for one of the English language exams given in Table 6.1. Tests must have been completed within two years of the start of the term for which the applicant would begin their program (e.g., an applicant starting in Fall 2020 must have completed their test after September 1, 2018).
- The Department of Mechanical Engineering accept potential graduate students through the Graduate Pathways Certificate (GPC) Program on the condition that they successfully complete the EAP 60 course before they enroll in their Mechanical Engineering graduate program.

Table 6.1: Minimum Scores for Approved Language Tests (see CGPS website)

Test	Fully Qualified		GPC qualified	
	Overall	in each area	Overall	in each area
TOEFL: Test of English as a Foreign Language	86	19	65	15
IELTS: International English Language Testing System	6.5	6.0	5.0	4.5
CanTEST: Canadian Test of English for Scholars and Trainees (Would require evaluation of speaking skills as well.)	4.5	4.5		
PTE: Pearson Test of English	63	59		
RTEP: Regina Test of English Proficiency	77%			
U-PREP 2: University Preparation 2 from the U of S Language Centre	75%			
MELAB: Michigan English Language Assessment Battery	85%			
CPE: University of Cambridge Certificate of Proficiency in English	C			
CAEL: Canadian Academic English Language	70%	60%		

Admission Requirements for Transfer Students

- The Department Graduate Student Transfer Policy states that a request to transfer to the Department of Mechanical Engineering from another academic unit will be considered in the same way as a new application to the department. Therefore, the

student must meet all department admission requirements in place at the time of the transfer request before a transfer can be recommended to the CGPS.

- These department admission requirements include completely satisfying the department's English language proficiency requirements.

Degree-specific Admission Requirements

Specific admission requirements for each graduate degree are given below.

MSc Admission Requirements

- A four-year degree in Mechanical Engineering, which is recognized by the department as equivalent to a University of Saskatchewan Bachelor of Science in Engineering (B.E.) degree, or a four-year degree in a closely related academic discipline relevant to the proposed field of study[1].
- A cumulative weighted average of **at least** 70.0% (U of S grade system equivalent) in the last two years of the undergraduate program (e.g., last 60 credit units)[2].
- Demonstrated ability for independent thought, advanced study, and research.

MEng Admission Requirements

- A four-year degree in Mechanical Engineering, which is recognized by the department as equivalent to a University of Saskatchewan Bachelor of Science in Engineering (B.E.) degree, or a four-year degree in a closely related academic discipline relevant to the proposed field of study[1].
- A cumulative weighted average of **at least** 70.0% (U of S grade system equivalent) in the last two years of the undergraduate program (e.g., last 60 credit units)[2].
- Demonstrated ability for independent thought, advanced study, and research.

PhD Admission Requirements

- A Master's degree in Mechanical Engineering, which is recognized by the department as equivalent to a University of Saskatchewan MSc degree (i.e., **thesis-based**), or a thesis-based Master's degree in a closely related academic discipline relevant to the proposed field of study[1,3].
- A cumulative weighted average of **at least** 70.0% (U of S grade system equivalent) in the last two years of study (i.e., coursework required in Master's program)[2].
- Demonstrated ability for independent thought, advanced study, and research.

PGD Admission Requirements[4]

- A four-year degree in Mechanical Engineering, which is recognized by the department as equivalent to a University of Saskatchewan Bachelor of Science in Engineering (B.E.) degree, or a four-year degree in a closely related academic discipline relevant to the proposed field of study[1].
- A cumulative weighted average of **at least** 65.0% (U of S grade system equivalent) in the last two years of the undergraduate program (e.g., last 60 credit units)[2].

Direct Entry PhD

- The Department of Mechanical Engineering does not admit applicants directly into a PhD program if they have not first completed a thesis-based Master's degree.
- A transfer from a MSc to a PhD program is possible for excellent graduate students. Details on the procedure, timing and requirements for a transfer from a MSc to a PhD program can be found in the Department of Mechanical Engineering Graduate Student Transfer Policy

Notes:

1 Applicants should have completed a four-year Bachelor's degree in Mechanical Engineering. An applicant may be considered for admission if their previous degree is from another engineering discipline, or the applied or natural sciences, if their proposed supervisor recommends to the department that the applicant's background provides adequate preparation for the proposed thesis research.

As individual engineering programs vary considerably, it may be difficult to determine if an applicant's degree is equivalent to a U of S B.E. degree without a detailed transcript analysis. Besides the transcript itself, resources that may be useful for this evaluation include course and program descriptions from the university issuing the transcript, and information used by engineering professional associations to evaluate their applicant's educational background (e.g., Engineers Canada's website: http://newcomers.engineerscanada.ca/)

An applicant may have completed an engineering degree based on coursework from both the institution granting the degree, as well as transfer credits from other institutions. A decision as to whether an applicant meets the admission requirements should be made on the basis of the applicant's degree program. Courses for which the applicant did not receive transfer credit will not be considered in determining whether or not their degree is equivalent to a U of S B.E. degree.

2 As individual universities use different grading systems, a grade conversion is necessary for most applicants in order to determine an admission average in the U of S grading system. In general, a grade conversion is based on establishing the relationships between the individual grades used in the institution the applicant

attended and the U of S grading system. An unofficial list of rough guides to help international students estimate their eligibility for admission can be found at: https://grad.usask.ca/admissions/grade-conversions.php. To receive an official evaluation of academic credentials and a grade conversion for admission average, an application for admission and application fee must be submitted.

Grades for the last two years of an undergraduate program are included in the calculation for a Master's or PGD program (e.g., at least 60 credit units for systems in which full courses are 3 credit units). All grades during the evaluation period will be included in the calculation of an admission average, including both failing grades and grades when the class is retaken. Beginning with the final term taken, entire terms are considered until a total of at least 60 credit units have been considered.

All grades obtained during a Master's program will be included in the calculation of an admission average for a PhD program.

3 Applicants must have a thesis-based Master's degree, such as the department's MSc degree, for admission to a PhD program. An applicant with a course/project-based Master's degree, such as the department's MEng degree, cannot be admitted directly into a PhD program. Such an applicant could first enroll in a MSc program and then request a transfer to the PhD program using the procedure outlined in the Department of Mechanical Engineering Graduate Student Transfer Policy (section 9).

4 The department will only admit students to a PGD program in cases where the student intends to pursue a Master's degree, but does not meet the required admission average. A faculty member must indicate that they are willing to supervise the applicant in the PGD program, and in a Master's program, should they meet the requirements for a transfer from the PGD program to a Master's program outlined in the Department of Mechanical Engineering Graduate Student Transfer Policy (section 9).

6.3 Application Procedures

- Information on application procedures will be communicated to applicants using the CGPS and department websites, and through email correspondence.
- Applicants must use the university's online system to apply. An applicant will not be accepted until a faculty member is willing to supervise them. There are three ways in which an applicant can find a faculty member who is willing to review a complete application file:
    - contacting faculty members directly,
    - completing a pre-qualification application at http://ntx.lv/2h4PuJf to find a supervisor, or
    - submitting an online application which will be circulated to faculty.

- A complete application consists of the following:
    - payment of the application fee;
    - three confidential letters of recommendation from persons under whom the applicant has studied or worked recently (a minimum of one of these letters should be from the last educational institution the applicant attended);
    - official transcripts listing all grades from all of the post-secondary institutions attended (scanned copies are acceptable for conditional admission but original documents in envelopes that have been sealed by the institution granting the degree are required for registration);
    - degree certificates if information on degree completion is not included on the transcripts (scanned copies are acceptable for conditional admission but original documents in envelopes that have been sealed by the institution granting the degree are required for registration);
    - if required, an acceptable score in a recognized English language proficiency test (a scanned copy is acceptable for conditional admission but an official transcript supplied directly from the testing agency is needed for registration);
    - a resume or curriculum vitae (CV); and
    - a statement of research interests.
- Upon receipt of an application, the department will conduct a preliminary review of the application to ensure that it is complete. The application will then be circulated to faculty member(s) who expressed interest in reviewing the complete application.
- A faculty member can recommend that an applicant be admitted by completing a department recommendation form, which will include information on funding commitments and required safety courses. The funding package of a student may include funding commitments from various sources including internal sources (including but not limited to: scholarships, fellowships, stipends and employment) and external sources (including but not limited to: scholarships and fellowships). The minimum funding level in the department is $1,000/month for a period of 24 months for a MSc student and 36 months for a PhD student.

  A faculty member may recommend admission for a student with funding less than the minimum level only if the faculty member supervises (or co-supervises) less than three Mechanical Engineering MSc and PhD students with funding less than the minimum level (including current students and those who have been offered admission by CGPS). It should be noted that a current student whose funding drops below the minimum level because the student failed to meet the performance or schedule clause(s) specified in the department letter of admission will not be counted towards this maximum number of three students who may be funded below the minimum level.
- The department will then do a complete review of the application file, including a detailed transcript analysis, in order to determine if the applicant meets the admission requirements and to calculate an admission average.
- The department will then recommend to the CGPS that the student be granted

admission. The CGPS will also be informed of any conditions for admission (e.g., receipt of official transcripts, completion of a degree that is in progress).

- The CGPS will then review the application, and make a final admission decision, which they will communicate to the applicant and the department. This offer of admission is valid for a limited period of time, as specified in the CGPS letter.
- A department letter of admission will be prepared, and signed by the department's graduate chair and proposed supervisor. The letter will include information on funding (including any conditions associated with this funding), required safety courses and a link to the department's graduate student handbook.
- If during the course of the review of an application, any of the documents submitted with the application are found to be fraudulent or plagiarized, the application will be rejected. These documents will also be reported to the CGPS for further action.

6.4 Conditional Admission

As noted in section 6.3, an applicant may be recommended for conditional admission if the following documentation has not been received:

- proof of completion of an undergraduate or graduate degree, and/or
- official transcripts and/or degree certificates, and/or
- official transcripts of acceptable English language test scores.

An offer of admission will remain conditional until the presentation of the required documentation.

Registration in a graduate program will not be allowed until the required documentation is provided by the applicant, and this documentation demonstrates that the student meets the admission requirements (e.g., students who were accepted for admission while a degree is in progress must provide proof that they have fulfilled all requirements for their degree and that they still meet all admission requirements, including an acceptable admission average).

6.5 Rejected Applications

- An applicant will be rejected if they do not meet the admission requirements or if no faculty member agrees to supervise their graduate program.
- The CGPS will keep files of rejected applicants for a minimum of one year after the online application was first submitted.
- An applicant's file may be reactivated if a faculty member later comes forward who is willing to supervise their program, or if the applicant provides new evidence that they meet the admission requirements (e.g., a new English language test score, transcripts after a program has been completed).
- If an application is reactivated, an applicant will be subject to the admission requirements at the time their file is reactivated.

- If an application is reactivated, an applicant will be required to submit new English language test scores if these scores are no longer valid. An applicant may also be asked to provide new letters of reference if these letters are more than one year old.

6.6 Admission Appeal Procedures

- University Council policy states that an applicant has the right to appeal an admission decision. Grounds for an admission appeal shall be limited to (1) unit procedural errors, (2) evidence that the information used in the assessment of the decision was wrong or incomplete, or (3) evidence that the assessment was not made according to the published admission qualifications and selection criteria. A failure by the applicant to provide accurate and complete information in accordance with the established admission qualifications and selection criteria shall not be grounds for an appeal.
- If the decision to reject an application was made at the department level, an applicant may first contact the department to appeal an admission decision informally on either of the grounds stated above. If the department determines that either procedural errors were made or that the information used in the admission decision was wrong or incomplete, the applicant's file will be reconsidered.
- If an applicant's concern has not been resolved by this informal appeal process, they may notify the department in writing that they are appealing the admission decision on either of the grounds above, and provide a written statement in support of this request. This written statement must be received by the department within 30 days of the date that the applicant was notified by the department that their application was rejected. The department head will form an appeal panel consisting of three faculty members in the department, who were not involved in the initial admission decision, and who would not be serving as a supervisor or co-supervisor if the applicant was admitted. The appeal panel will consider the written request and the application file and determine either to uphold the original admission decision or to have the department reconsider the application.
- If the decision of the department appeal panel is to uphold the original admission decision, this decision cannot be appealed further at the department level.
- If the decision of the department appeal panel is that the application be reconsidered, the department will reconsider the application using the admission requirements that are in effect at the time the application is reevaluated, and either admit or reject the applicant. This decision cannot be appealed further at the department level.
- If an applicant has gone through the department appeal process, and still wishes to appeal a department admission decision, an appeal can be made directly to the CGPS using the procedure outlined in CGPS Policies. The applicant or department may also use this procedure to appeal an admission decision that was made at the CGPS level.

6.7 Deferrals of Admission

- An applicant who has received an offer of admission may request in writing to the department that their admission be deferred for up to one year from the start of the term for which they were admitted. If the supervisor supports this request, the department will recommend deferral to the CGPS. If the CGPS approves the deferral, a

new letter of offer will be issued by the CGPS. If requested by the supervisor, a new department letter of admission will be prepared, and signed by the department's graduate chair and proposed supervisor.

- If an applicant wishes to defer their admission for more than one year from the term for which they had originally applied, they must submit a new application. This application will be considered using the admission requirements in place at the time the new application is submitted.

7 Program Requirements

This section lists the specific requirements for each graduate degree and the Post Graduate Diploma.

7.1 PhD Program Requirements

- completion of a minimum of 6 credit units (e.g., two 3-credit courses);
- completion of a project report;
- completion of GSR 960 (online Introduction to Ethics and Integrity course);
- completion of GSR 961 (online Ethics and Integrity in Human Research course - only if research involves human subjects);
- completion of GSR 962 (online Ethics and Integrity in Animal Research course - only if research involves animal subjects);
- completion of the ME 990 graduate seminar course (attend, give two seminars and complete assignments);
- successful completion of qualifying and comprehensive exams; and
- an oral defence of a thesis.
- Note that PhD students may replace one of their ME 990 seminar presentations with a presentation at a national or international research conference.
- PhD students must maintain continuous registration in the ME 996 (thesis) course.
- The residency requirement for the PhD degree is one year.

7.2 MSc Program Requirements

- completion of a minimum of 15 credit units (e.g., five 3-credit courses);
- 3 credit units may be senior (300-400 level) undergraduate courses
- completion of a project report;
- completion of GSR 960 (online Introduction to Ethics and Integrity course);
- completion of GSR 961 (online Ethics and Integrity in Human Research course - only if research involves human subjects);
- completion of GSR 962 (online Ethics and Integrity in Animal Research course - only if research involves animal subjects);
- completion of the ME 990 graduate seminar course (attend, give one seminar and complete assignments); and
- an oral defence of a thesis.
- MSc students must maintain continuous registration in the ME 994 (thesis) course.
- The residency requirement for the MSc degree is one year.

7.3 MEng Program Requirements

- completion of a minimum of 24 credit units (e.g., eight 3-credit courses);
- 6 credit units may be senior (300-400 level) undergraduate courses
- completion of a project report;
- completion of GSR 960 (online Introduction to Ethics and Integrity course);
- completion of GSR 961 (online Ethics and Integrity in Human Research course - only if research involves human subjects);
- completion of GSR 962 (online Ethics and Integrity in Animal Research course - only if research involves animal subjects); and
- completion of the ME 990 graduate seminar course (attendance only).
- MEng students must maintain continuous registration in the ME 992 (project) course.
- The residency requirement for the MEng degree is one year.

7.4 PGD Program Requirements

- completion of a minimum of 30 credit units (e.g., ten 3-credit courses);
- 12 credit units may be senior (300-400 level) undergraduate courses
- completion of GSR 960 (online Introduction to Ethics and Integrity course);

8 Devolved Graduate Scholarship Program Policy

8.1 Eligibility Requirements

Students do not apply directly for devolved graduate scholarships. Instead, current or proposed U of S supervisors are responsible for nominating graduate students for devolved scholarships.

Graduate scholarships can be awarded to full-time MSc and PhD students in the Department of Mechanical Engineering. Students registered in the PGD and MEng programs are not eligible. A blend of scholarship and grant support is allowed, however students holding other major scholarships or awards (such as an NSERC Postgraduate Scholarship or Dean's Scholarship), or with similar support, would not normally be eligible for a devolved scholarship.

A student must have a minimum 80% (U of S equivalent) average in their last undergraduate or graduate program in order to be eligible for a scholarship. For new students, who are nominated for a PhD scholarship, this would be the average in their MSc program. For new students, who are nominated for a MSc scholarship, this would be the average in their last two years of their B.Sc. program (corresponding to at least 60 credit units (or equivalent)). In the case of a new student who is nominated for a MSc scholarship who already holds a MSc degree, this would be the average in their previous MSc program.

For current students nominated for MSc or PhD scholarships, this would be the average in courses they have taken to date in their current U of S graduate program.

As the exact grading scale may differ from university to university within an individual country, a decision regarding a new student's eligibility for a scholarship will be based on the average calculated for admission purposes. The Education Equity Plan for the College of Graduate and Postdoctoral Studies (CGPS) and the responsibilities for implementing that plan will be followed.

8.2 Value of Awards

The value of devolved graduate scholarships is currently $17,000 per year at the MSc level and $21,000 per year at the PhD level. To increase the number of students supported by scholarships, our practice is to ask the supervisor(s) to cover half of the scholarship amount. In exceptional cases, the full amount would be covered by the department's devolved funds.

8.3 Scholarship Competitions

An annual scholarship competition will be held (typically in June). The scholarship competition will focus on current or newly admitted students (i.e., those who have accepted an admission offer). The Graduate Studies Committee may also decide to award the department's allocation of Graduate Research and Teaching Fellowships at the same time that they award devolved scholarships. A current MSc student, who wishes to be considered for a scholarship for a PhD program after completing their MSc program would

be considered to be a new student for purposes of the scholarship competition. A current MSc student who wishes to be considered for a PhD scholarship after a transfer to a PhD program is approved would be considered to be a continuing student for purposes of the scholarship competition. The Graduate Studies Committee may hold special scholarship competitions throughout the year but will always inform faculty at least one month before the competition deadline.

Each year, the Graduate Studies Committee will also automatically offer devolved scholarships to the three U of S Mechanical Engineering undergraduate students with the highest cumulative weighted averages who are eligible to begin a graduate program in the following academic year. If any of these students do not accept the scholarship, the Committee will offer these scholarships to other eligible ME students in order of their cumulative weighted average. These scholarships will be conditional on the student's average at the end of their undergraduate program meeting the minimum 80% requirement for scholarships, as outlined in the Eligibility Requirements section. Students who are graduating from our undergraduate program are also eligible for the annual scholarship competition.

8.4 Evaluation Criteria

The scholarships will be awarded based on the recommendations of the Graduate Studies Committee. The applicants will be evaluated based on academic excellence, and research potential and contributions, although the final decision will be based on the judgment of the committee. The evaluation will consider evidence such as, but not limited to:

- Nomination letter from current or proposed supervisor(s);
- Official transcripts;
- Resume/curriculum vitae and statement of research interest included in the application file;
- Quality and number of publications and other research contributions;
- Relevance of work experience and academic training to field of proposed research;
- Scholarships and awards held;
- Reference letters included in the application file;
- Duration of previous studies;
- Ranking of the applicant within the peer group; and
- Results of recognized graduate aptitude tests (e.g., GRE) if supplied by student.

The most valuable reference letters are those that imply a ranking of the student within the peer group.

Another factor that may be considered in awarding scholarships is the distribution of scholarships among supervisors and research groups. If there are a large number of applications, supervisors and/or Graduate Studies Committee members may be asked to review and rank the applications and nominations from their research group.

8.5 Duration of Scholarships

The durations of the graduate scholarships reflect (and encourage) the expected completion times for MSc and PhD degrees in the Department of Mechanical Engineering, which are two and four years, respectively.

- MSc students can receive a maximum of two years of support less the amount of time the student has been in the MSc, MEng, and/or PGD programs.
- PhD students can receive a maximum of four years of support less the amount of time the student has been in the PhD program.
- The maximum time period for which a graduate student can receive scholarship support from the department, including both MSc and PhD programs (including students transferring from the MSc to PhD program), is four years.

Normally, no extensions will be granted for scholarships. Under exceptional circumstances, on the recommendation of the advisory committee, extensions may be granted.

8.6 Renewal of Scholarships

Devolved scholarship holders wishing to renew their scholarships must apply to the Graduate Studies Committee annually. Scholarships are eligible for renewal up to the maximum scholarship duration listed above provided that:

- the student maintains a minimum average of 80% in the courses they have taken during their current graduate program; and
- the student continues to make satisfactory progress in their research and other degree requirements; and
- the student continues to meet the eligibility requirements.

Scholarship holders must submit an annual scholarship progress report by June 30 using the form provided. This report should summarize the main accomplishments made during the previous year and provide any additional information the Graduate Studies Committee needs to evaluate the progress made by the student in research, coursework and other degree requirements. The student must also provide an explanation for any difficulties encountered in their program over the past year (e.g., delays in research progress, a minimum average below 80%). This form must be signed by the student's supervisor(s), who may also provide comments on the student's progress and any difficulties encountered. The Graduate Studies Committee will review requests for scholarship renewals and inform students whether their scholarship has been renewed by August 1.

8.7 Matching Funding for Other Scholarships/Awards

Besides funding students who are awarded scholarships in the devolved scholarship competition, matching funding will also be available for certain awards from the department's devolved scholarship fund.

- The department aims to provide one year of matching funds for approximately four students who are awarded CGPS Dean's Scholarships each year. Holders of MSc Dean's Scholarships who receive matching funding from the department will receive 50% of the value of this award in the second year of their program from the devolved scholarship fund, while their supervisor(s) will provide the other 50% of the award in the second year. Holders of PhD Dean's Scholarships who receive matching funding from the department will receive 50% of the value of this award in the third year of their program from the devolved scholarship fund while their supervisor(s) will provide the other 50% of the award in the third year.
- Faculty who receive a CGPS New Faculty Graduate Student Award funding will receive one year of matching funding from the devolved scholarship fund. The student who receives this funding must meet the eligibility requirements for a Devolved Scholarship and must be approved by the College of Graduate and Postdoctoral Studies (CGPS). The student must apply for renewal of the scholarship for the second year to the Graduate Studies Committee by June 30 using the same form as students who hold a Department Devolved Scholarship.
- Students who receive a NSERC or other national scholarship, and do not receive a tuition award from the College of Graduate and Postdoctoral Studies (CGPS) will also be considered by the Graduate Studies Committee for a $3000 tuition award.

9 Policies for Graduate Student Transfers

9.1 General Requirements for Transfers

As per Section 10.5 of CGPS Policies, transfers between academic units or between graduate programs within the same academic unit must be approved by the CGPS. All transfers must be initiated by a written request from the student to the Graduate Chair of the Department of Mechanical Engineering. The student's Supervisor(s) should also contact the Graduate Chair in writing to indicate their support for the requested transfer.

The Graduate Chair will review the written request, as well as comments from the student's Supervisor(s), Advisory Committee and current department (if applicable). Before making a decision whether to recommend the transfer, the Graduate Chair will also review supporting information in the student's file, including:

- academic performance to date at the University of Saskatchewan,
- progress reports prepared for the student's Advisory Committee,
- minutes of any Advisory Committee meetings held to date, and
- performance on qualifying and/or comprehensive exams.

Specific policies for each type of transfer are provided below.

9.2 Transfer from another Academic Unit to the Department of Mechanical Engineering

A request to transfer to the Department of Mechanical Engineering from another academic unit will be considered in the same way as a new application to the department. Therefore, the student must meet all department admission requirements before the transfer can be considered. A transfer can only be made to the same graduate degree program in which the student is registered in the current academic unit.

The student, Supervisor(s) and the Graduate Chair of the student's current department should provide a written statement supporting the requested transfer. The student's file should be provided, including minutes of any Advisory Committee meetings that have taken place.

In addition to the information listed in Section 9.1, the following supporting information will also be considered by the Mechanical Engineering Graduate Chair:

- academic performance at previous institutions,
- a statement of research interests,
- letters of recommendation, and
- results of recognized English language proficiency tests (if applicable).

In determining whether or not to recommend a transfer from another academic unit, the following general principles will be used.

Rationale for the transfer: There must be a clear rationale given as to why the student is requesting the transfer. This rationale should provide the following information for a transfer from another academic unit to the Department of Mechanical Engineering.

- The reasons why the student wishes to transfer to Mechanical Engineering from their current academic unit.
- A description of both the student's current thesis research program and any changes that would be made to this research program if they were to transfer to Mechanical Engineering.
- Any reasons why the student's current thesis research program cannot be completed in the current academic unit and/or with the current Supervisor(s). If the student will be changing Supervisors, both the current and new Supervisors must provide written support for the transfer.
- A proposed timeline for completion of the student's graduate program.
- The Supervisor for the proposed program in Mechanical Engineering should provide a description of any proposed changes to the student's Program of Studies (e.g., changes to required coursework or Advisory Committee membership)[1].
- The Graduate Chair of the student's current department should also indicate if an Advisory Committee meeting was held to discuss the request for a transfer to Mechanical Engineering and the revised Program of Studies.

Timing of the transfer: Transfers from another academic unit to Mechanical Engineering will normally only be considered within the following time periods:

- PGD – after the completion of a minimum of 5 graduate courses and no later than 12 months after the beginning of a student's graduate program;
- MEng and MSc – after the completion of a minimum of 2 graduate courses and no later than 12 months after the beginning of the student's graduate program; and
- PhD – after the completion of a minimum of 1 graduate course and no later than 18 months after the beginning of the student's graduate program.

Any requests for transfers to Mechanical Engineering outside of these time limits must include a description of any extenuating circumstances that should be considered (e.g., approved leaves).

Additional information: The Graduate Chair may request additional information from the student, Supervisor(s), Advisory Committee, current academic unit, ME Graduate Studies

[1] If the student will be requesting transfer credit for coursework completed at another institution, sufficient information must be provided in order to determine whether or not the department can recommend that these transfer credits be approved (please see Section 9.5 of CGPS Policies for more details).

Committee or the CGPS, if necessary.

The Graduate Chair will review the request and supporting information, before determining whether or not to recommend the transfer to the CGPS. If the CGPS approves the transfer to Mechanical Engineering, an Advisory Committee meeting should be held as soon as possible in order to develop the student's new Program of Studies. This new Program of Studies will be based on the Department of Mechanical Engineering course and program requirements for the student's degree, including number of required courses, ME 990 seminar, and qualifying and comprehensive exam requirements. When developing the recommended Program of Studies, the Advisory Committee will consider whether any work completed in the previous academic unit can be used towards the Mechanical Engineering course and program requirements of the student's degree.

Summary of Steps Involved In Transfer from another Academic Unit to Mechanical Engineering

1. Student consults current Supervisor(s) (and new Supervisor(s) if also proposing a change in Supervisor(s)) to discuss transfer to Mechanical Engineering.
2. Student provides written request for transfer to ME Graduate Chair
3. Supervisor(s) of proposed new program provides written statement indicating their support of transfer and describing proposed changes to Program of Studies to Graduate Chair.
4. ME Graduate Chair contacts Graduate Chair of current academic unit to determine if student's current academic unit and Advisory Committee support transfer, and to request student's file.
5. ME Graduate Chair reviews transfer request and supporting information, and informs student, Supervisor(s), current academic unit and the CGPS if department recommends transfer.
6. If department recommends transfer, the CGPS reviews department recommendation and informs student, Supervisor(s) and both academic units if transfer is approved.
7. If transfer to Mechanical Engineering is approved, ME Graduate Chair calls meeting of Advisory Committee to develop new Program of Studies.

9.3 Transfer From or Into the Postgraduate Diploma (PGD)

The requirements for a transfer from or into the PGD program are based on the student's status when originally admitted to the PGD program. In determining whether or not to recommend a transfer from or into the PGD program the following general principles will be used.

Rationale for the transfer: There must be a clear rationale given as to why the student is requesting the transfer from or into the PGD program. This rationale should provide the following information.

- The reasons why the student wishes to transfer from or into the PGD program.
- A brief description of the proposed thesis research, if the student is requesting a transfer from the PGD to the MSc program.
- If the student will be changing Supervisors, both the current and new Supervisors must provide written support for the transfer.
- A proposed timeline for completion of the student's new graduate degree program.
- The Supervisor(s) of the student's proposed new program should provide a description of any proposed changes to the student's Program of Studies (e.g., changes to required coursework) should the transfer from or into the PGD program be approved.

Recommendation of the Advisory Committee: If the student is requesting a transfer from a MSc to a PGD program, an Advisory Committee meeting must be held to consider this request. A written statement, which provides the rationale for the requested transfer must be provided to all committee members in advance of this meeting. The Advisory Committee will transmit its recommendation for a transfer from a MSc to a PGD program, along with a recommended Program of Studies to the Graduate Chair

Timing of the transfer: Transfers from or into a PGD program will only be considered within the following time periods:

- PGD students who were fully qualified as MSc or MEng students when they were admitted (e.g., a U of S equivalent average of at least 70%) may request a transfer into a MSc or MEng program at any time.
- PGD students who were not fully qualified as MSc or MEng students when they were admitted (e.g., a U of S equivalent average of between 65 and 70%) may only request a transfer into a MSc program after completion of 15 credits units of 800 level coursework with a cumulative average of 80% and no grades below 75%.
- PGD students who were not fully qualified as MSc or MEng students when they were admitted (e.g., a U of S equivalent average of between 65 and 70%) may only request a transfer into a MEng program after completion of 18-21 credits units of 800 level coursework with a cumulative average of 80% and no grades below 75%[2].
- MSc and MEng students may request a transfer to a PGD program at any time in their program.
- **Additional information:** The Graduate Chair may request additional information from the student, Supervisor(s), Advisory Committee, ME Graduate Studies Committee or the CGPS, if necessary.

The Graduate Chair will review the request and supporting information before determining whether or not to recommend the transfer to the CGPS. If the CGPS approves a transfer from a PGD to a MSc program, an Advisory Committee meeting

[2] An exception may be made for a student who has completed 15 credits, if their new Program of Studies includes completing both their MEng project and their remaining 9 credits in the following term.

should be held as soon as possible to develop the new Program of Studies and to review the student's research proposal. If a transfer to a PGD or MEng program is approved, the Supervisor(s) will develop a new Program of Studies.

Summary of steps involved in transfer from or into a PGD Program

1. Student consults current Supervisor(s) (and new Supervisor(s) if also proposing a change in Supervisor(s)) to discuss transfer from or into PGD program.
2. Student provides written request for transfer to Graduate Chair.
3. Supervisor(s) of proposed new program provides written statement to Graduate Chair indicating their support of transfer from or into PGD and describing proposed changes to Program of Studies.
4. If student is transferring from a MSc to a PGD program, an Advisory Committee meeting must be held to review transfer request and to approve new Program of Studies. The Advisory Committee transmits its recommendation and recommended Program of Studies to the Graduate Chair.
5. Graduate Chair reviews transfer request and supporting information, and informs student, Supervisor(s) and the CGPS if department recommends transfer.
6. If department recommends transfer, the CGPS reviews department recommendation and informs student, Supervisor(s) and Graduate Chair if transfer from or to PGD is approved.
7. If transfer from PGD to MSc program is approved, Graduate Chair calls meeting of Advisory Committee as soon as possible to develop new Program of Studies and to review MSc research proposal. If transfer to MEng program is approved, Supervisor(s) develop new Program of Studies.

9.4 Transfer Between MEng and MSc Programs

A request to transfer between MEng and MSc programs will only be considered after the student has consulted with their Supervisor, Advisory Committee and the Graduate Chair. In determining whether or not to recommend a transfer between Master's programs, the following general principles will be used.

Rationale for the transfer: There must be a clear rationale given as to why the student is requesting the transfer from either a MEng to a MSc program, or from a MSc to a MEng program. This rationale should provide the following information.

- The reasons why the student wishes to transfer between Master's programs.
- If the student will be changing Supervisors, both the current and new Supervisors must provide written support for the transfer.
- A proposed timeline for completion of the student's new graduate degree program.

- The Supervisor(s) of the student's proposed new program should provide a description of any proposed changes to the student's Program of Studies (e.g., changes to required coursework) should the transfer between Master's programs be approved.

Recommendation of the Advisory Committee: If the student is requesting a transfer between Master's programs, an Advisory Committee meeting must be held to consider this request. A written statement, which provides the rationale for the transfer must be provided to all committee members in advance of this meeting. If the student is requesting a transfer to a MSc program, a research proposal must also be provided, which includes research objectives, a description of the proposed methodology and a schedule for completion.

The Advisory Committee will transmit its recommendation for a transfer between Master's programs, along with a recommended Program of Studies to the Graduate Chair.

Timing of the transfer: Transfers between Master's programs may be considered at any time. However, it is recommended that Advisory Committee meetings to consider transfers between the MEng and MSc programs be held in the same general time period as other MSc students (after 8-9 months in the program). This will allow the Advisory Committee to consider the student's academic performance in courses at the U of S, and to provide the student sufficient time to prepare a research proposal, if required. However, the student, Supervisor(s), Advisory Committee or Graduate Chair may request a meeting after the first term of the program.

Additional information: The Graduate Chair may request additional information from the student, Supervisor(s), Advisory Committee, ME Graduate Studies Committee or the CGPS, if necessary.

The Graduate Chair will review the request and supporting information before determining whether or not to recommend the transfer to the CGPS.

Summary of Steps Involved in Transfer between Master's Programs

1. Student consults current Supervisor(s) (and new Supervisor(s) if also proposing a change in Supervisor(s)) to discuss transfer between Master's programs.
2. Student provides written request for transfer to Graduate Chair.
3. Supervisor(s) of proposed new program provides written statement to Graduate Chair indicating their support of transfer between Master's programs and describing proposed changes to Program of Studies.
4. ME Graduate Chair calls Advisory Committee meeting to review transfer request and to develop new Program of Studies. The Advisory Committee transmits its recommendation and recommended Program of Studies to the

Graduate Chair.

5. ME Graduate Chair reviews transfer request, along with recommendation of Advisory Committee and supporting information, and informs student, Supervisor(s) and the CGPS if department recommends transfer and revised Program of Studies.
6. If department recommends transfer, the CGPS reviews department recommendation and informs student, Supervisor(s) and Graduate Chair if transfer between Master's programs and revised Program of Studies are approved.

9.5 Transfer From PhD To MEng or MSc Program

A request to transfer from a PhD program to an MEng or MSc program will only be considered after the student has consulted with their Supervisor, Advisory Committee and the Graduate Chair. In determining whether or not to recommend a transfer from a PhD to a Master's program, the following general principles will be used.

Rationale for the transfer: There must be a clear rationale given as to why the student is requesting the transfer from a PhD to a MEng or MSc program. This rationale should provide the following information.

- The reasons why the student wishes to transfer from a PhD to a Master's program.
- If the student will be changing Supervisors, both the current and new Supervisors must provide written support for the transfer.
- A proposed timeline for completion of the student's new graduate degree program.
- The Supervisor(s) of the student's proposed new program should provide a description of any proposed changes to the student's Program of Studies (e.g., changes to required coursework) should the transfer from a PhD to a Master's program is approved.

Recommendation of the Advisory Committee: If the student is requesting a transfer from a PhD to a Master's program, an Advisory Committee meeting must be held to consider this request. A written statement, which provides the rationale for the transfer must be provided to all committee members in advance of this meeting. If the student is requesting a transfer from a PhD to a MSc program, a research proposal must also be provided, which includes research objectives for the proposed MSc program, along with a description of the proposed methodology and a schedule for completion.

One particular issue that the Advisory Committee will need to discuss is whether to recommend a transfer to the MSc or the MEng program.

The Advisory Committee will transmit its recommendation for a transfer from a PhD to a Master's program, along with a recommended Program of Studies to the

Graduate Chair.

Timing of the transfer: A transfer between a PhD and a Master's program may be considered at any time. However, it is recommended that Advisory Committee meetings to consider transfers from the PhD to a Masters program be held in the same general time period as other PhD students (after 8-9 months in the program). This will allow the Advisory Committee to consider student's academic performance in the required courses at the U of S, the student's research performance and potential, and to provide the student sufficient time to prepare a research proposal. However, the student, Supervisor(s), Advisory Committee or Graduate Chair may request a meeting after the first term of the program.

Additional information: The Graduate Chair may request additional information from the student, Supervisor(s), Advisory Committee, ME Graduate Studies Committee or the CGPS, if necessary.

The Graduate Chair will review the request and supporting information before determining whether or not to recommend the transfer to the CGPS.

Summary of Steps Involved in Transfer from PhD To Master's Program

1. Student consults current Supervisor(s) (and new Supervisor(s) if also proposing a change in Supervisor(s)) to discuss transfer from PhD to Master's program.
2. Student provides written request for transfer to Graduate Chair.
3. Supervisor(s) of proposed new program provides written statement indicating their support of transfer from PhD to Master's program and describing proposed changes to Program of Studies to Graduate Chair.
4. Graduate Chair calls Advisory Committee meeting to review transfer request and to develop new Program of Studies. The Advisory Committee transmits its recommendation and recommended Program of Studies to the Graduate Chair.
5. Graduate Chair reviews transfer request, along with recommendation of Advisory Committee and supporting information, and informs student, Supervisor(s) and the CGPS if department recommends transfer and revised Program of Studies.
6. If department recommends transfer, the CGPS reviews department recommendation and informs student, Supervisor(s) and Graduate Chair if transfer from PhD to Master's program and revised Program of Studies are approved.

9.6 Transfer from MSc to PhD Program

A transfer from a MSc to a PhD program is possible for excellent graduate students. As stated in Section 10.5.5 of CGPS Policies, there must be clear evidence that the student demonstrates great promise in terms of academic performance and research

performance and/or potential. Evidence of great promise includes:

- excellent academic standing based on grades in at least 9 credit units of coursework[3]
- very good to excellent writing and oral communication ability, and
- demonstration of the requisite research skills and knowledge to be able to successfully complete a PhD dissertation.

It should also be clear that it is to the student's benefit to transfer to the PhD program without first completing a MSc degree. In determining whether or not to recommend a transfer from a MSc to a PhD program, the following general principles will be used.

Rationale for the transfer: There must be a clear rationale given as to why the student is requesting a transfer from a MSc to a PhD program. This rationale should provide the following information.

- The reasons why the student wishes to transfer from the MSc to the PhD program, and why the student would benefit from this transfer.
- How the proposed PhD thesis research relates to any MSc thesis research already completed.
- An explanation why the student's academic and research performance demonstrates that the student shows great promise (e.g., how does the student's performance in coursework and research compare to other students in the same research group).
- If the student will be changing Supervisors, both the current and new Supervisors must provide written support for the transfer.
- A proposed timeline for completion of the student's PhD degree program.
- The Supervisor(s) should provide a description of any proposed changes that will be made to the student's Program of Studies if the transfer to the PhD program is approved (note that a student transferring from a MSc to a PhD program is required to take a minimum of 21 credit units of coursework).

Recommendation of the Advisory Committee: If the student is requesting a transfer from a MSc to a PhD program, a MSc Advisory Committee meeting must be held to consider this request (i.e., Supervisor, two committee members and the Graduate Chair or designate). A written statement, which provides the rationale for the transfer must be provided to all committee members in advance of this meeting, along with a research proposal, which includes research objectives, a description of

[3] The historical average for MSc and PhD students in our department is between 80% and 85%. While averages in individual courses vary, this would indicate that a student requesting a transfer to a PhD program should have a minimum average in the mid to high 80's.

the proposed methodology and a schedule for completion. The Advisory Committee will then make a preliminary assessment of the request for a transfer to determine whether or not there is sufficient evidence to merit the scheduling of a qualifying exam.

If the Advisory Committee determines that the student does have the potential to transfer to a PhD program, they will then set a qualifying exam for the student and communicate the format, content and schedule of the exam to the student. A cognate member will also be added to the Advisory Committee. As per CGPS Policies, the PhD qualifying exam must be at least as rigorous as a MSc thesis defence, and the results of the qualifying exam must provide clear evidence of the student's potential for successfully completing a PhD without first completing their MSc degree. A student may only take a qualifying exam once for the purpose of a transfer to a PhD program.

The Advisory Committee will transmit its recommendation for a transfer from a MSc to a PhD program, along with a recommended Program of Studies to the Graduate Chair.

Timing of the transfer: Section 10.5.5 of CGPS Policies states that transfers from a MSc to a PhD program should be considered in the second year of the student's program (i.e., no later than 24 months from the beginning of the program). The following timeline is recommended for these transfers.

- Advisory Committee meetings to consider requests for transfers from a MSc to a PhD program should be held only after the student has completed their 15 credit units of required coursework for the MSc degree. This will provide a better opportunity for a student to demonstrate excellent academic performance than the minimum 9 credit units specified in CGPS Policies.
- Students should have sufficient opportunity to demonstrate their research promise prior to the Advisory Committee meeting being held (e.g., 4-8 months of research work).
- Based on the above two points, an Advisory Committee meeting after 12-18 months of the student's program may be appropriate.

Additional information: The Graduate Chair may request additional information from the student, Supervisor(s), Advisory Committee, ME Graduate Studies Committee or the CGPS, if necessary.

The Graduate Chair will review the request and supporting information before determining whether or not to recommend the transfer to the CGPS.

Summary of Steps Involved In Transfer from MSc to PhD Program

1. Student consults current Supervisor(s) (and new Supervisor(s) if also proposing a

change in Supervisor(s)) to discuss transfer from MSc to PhD program.

2. Student provides written request for transfer to Graduate Chair.
3. Supervisor(s) of proposed new program provides written statement indicating their support of transfer from MSc to PhD program and describing proposed changes to Program of Studies to Graduate Chair.
4. Graduate Chair calls MSc Advisory Committee meeting to conduct a preliminary review of transfer request. If Advisory Committee feels that there is sufficient evidence to support scheduling a qualifying exam, a cognate member will be added to the Advisory Committee and the format, scheduling and content of the qualifying exam will be determined and communicated to the student.
5. A qualifying exam will be held. The Advisory Committee (including the cognate member) will review the student's performance on the qualifying exam and will decide whether or not to recommend a transfer to a PhD program and a revised Program of Studies. The Advisory Committee will transmit its decision and the recommended Program of Studies to the Graduate Chair.
6. Graduate Chair reviews transfer request, along with recommendation of Advisory Committee and supporting information, and informs student, Supervisor(s) and the CGPS if department recommends transfer and revised Program of Studies.
7. If department recommends transfer, the CGPS reviews department recommendation and informs student, Supervisor(s) and Graduate Chair if transfer from MSc to PhD program and revised Program of Studies are approved.

10 Policy on PhD Qualifying and Comprehensive Examinations

10.1 Qualifying Examination

The purpose of the Qualifying Examination is to satisfy the academic unit that the student has the potential to obtain sufficient knowledge of the chosen general field of study to proceed toward candidacy for the PhD degree.

- The Qualifying Examination will normally be completed at the first Advisory Committee (AC) meeting, but at least within the first year of the PhD program.
- The Advisory Committee Chair is responsible for scheduling the Qualifying Examination.
- The Qualifying Examination will consist of a written report, oral presentation and oral examination. The written report will be the first AC report as described in section 11 and Appendix B and C. The report should be about 10 pages (main body), plus appendices, and should be provided to the Advisory Committee at least two weeks before the oral examination. The report may be slightly longer than ten pages if necessary, but the main body of the report should never exceed 15 pages.

10.2 Comprehensive Examination

The purpose of the Comprehensive Examination is to determine whether the student has a mature and substantive grasp of the field as a whole.

- The Comprehensive Examination should normally be completed within the first two years of the PhD program.
- The Comprehensive Examination should normally be discussed and scheduled at the second AC meeting.
- The Advisory Committee Chair is responsible for scheduling the Comprehensive Examination.
- The Comprehensive Examination is a written examination with an optional (at the discretion of any member of the Advisory Committee) oral examination following the written examination.
- The Examination is to be completed by the student without input from others. The student should not use written material which has supervisor/co-author inputs as part of their answer. Students are expected to submit their own individual work, properly cite the work of themselves or others, and to follow the rules for examinations. Academic misconduct, plagiarism, and cheating will not be tolerated. Copying of reports is considered academic misconduct. Students are responsible for understanding the university's policies on academic integrity and academic misconduct. For more information, please consult the University Council Regulations on Student Academic Misconduct and the university's examination regulations (https://www.usask.ca/secretariat/student-conduct-appeals/StudentAcademicMisconduct.pdf).
- The Comprehensive Examination will be graded pass/fail based on the majority vote of the Advisory Committee. An Advisory Committee meeting is required if one or more of

the examiners grades the exam as a failure.

- The Advisory Committee will choose one of the following examination formats:

a. Traditional Examination

- This examination will consider material at the B.Sc. and MSc levels.
- Three topics related to the research area of the student will be chosen by the Advisory Committee and announced to the student at least one month before the examination.
- A written examination will be given to the student on each topic. The time allowed for each examination will be determined by the Advisory Committee but there should be at least one day between each examination.

b. Research Report Examination

- Three topics related to the research area of the student will be chosen by the Advisory Committee. The examination will be a maximum of one month in duration.
- Advisory Committee members (excluding the Chair) will provide a general question (questions can have several parts) and the student will provide a written report (about 5-10 pages) answering/discussing each question. The three reports can be combined into one report (30 pages maximum) with distinct parts.

c. Research Paper Examination

- The topic(s) of the research paper will be chosen by the Advisory Committee. The examination will be a maximum of six weeks in duration.
- The student will prepare an independent research paper that addresses the topic(s).
- The research paper should follow the style and length of a recognized journal in the field of study, selected by the Advisory Committee.

10.3 General

- The grade (pass/fail) of a Qualifying or Comprehensive Examination should be communicated to the student by the Advisory Committee Chair or the Graduate Chair via email or letter within one week following the decision of the Advisory Committee.
- A student failing a Qualifying or Comprehensive Examination is permitted a second examination with permission of the Dean of the College of Graduate and Postdoctoral Studies (CGPS). A second failure automatically disqualifies the student from further work for that particular PhD degree. This failure may be appealed to the Graduate Academic Affairs Committee on substantive or procedural grounds.

11 Guidelines for Advisory Committee (AC) Progress Reports

11.1 Schedule of Advisory Committee (AC) Reports and Meetings

The general timeline for advisory committee reports and meetings for MSc and PhD students are given below. The student is responsible to submit AC reports on time so the AC members have at least 2 weeks to review AC reports prior to the AC meetings.

- Month 8 (15th day):
    - 1st AC report due
- Month 9:
    - 1st AC meeting for MSc students
    - 1st AC meeting and qualifying exam for PhD students
- Month 20:
    - 2nd AC report due
- Month 21:
    - 2nd AC meeting (virtual meeting for MSc students that will defend their thesis before month 24)
    - 2nd AC meeting and AC determines type and dates for comprehensive exam
- Month 24 – end of program:
    - At least one AC meeting per year

11.2 Advisory Committee (AC) Report Guidelines

The main purpose of the first MSc/PhD AC report is to identify the student's research objectives and to present the student's plan for the remainder of the MSc/PhD program. The first AC report should document the research proposal, including the motivation for the research, the objectives and the research methodology the student proposes to use. This will allow the AC to provide meaningful feedback and suggestions on the proposed research. The first PhD AC meeting will normally serve as the Qualifying Examination as described in section 10.1.

The guidelines and template for the format of MSc and PhD AC progress reports are contained in Appendix B, C and D.

- Appendix B: ME AC Report Guidelines
- Appendix C: ME AC Report Example
- Appendix D: ME AC Report Guidelines (2nd MSc meeting)

These Appendixes contain detailed information on formatting and how to complete each section of the AC report. It is hoped that these guidelines will make it easier for students to prepare reports that clearly and concisely outline their proposed research, their progress and their plans for the coming year. This will also help ACs provide meaningful feedback to students.

The first MSc AC report should be a maximum of ten pages, not including the list of references, the title page and the overview of student's progress. The second MSc AC

report for the virtual AC meeting should be a maximum of two pages. PhD reports may be slightly longer than ten pages if necessary, but the main body of the report should never exceed 15 pages. Also, the 2nd and 3rd PhD AC reports are not required to follow the page limits specified for each section in the guidelines

Students should not feel obligated to submit a ten page report. A short, concise, well-written report that contains the important and relevant information is preferred to a long, verbose report that is poorly written and contains unclear or irrelevant information. The AC report may use appropriate Appendixes to enhance the report, but the main body of the report should be self-contained and understandable without reading the Appendixes.

APPENDIX A:
Declaration of Academic Integrity

Declaration of Academic Integrity

Graduate Program

Department of Mechanical Engineering

University of Saskatchewan

I, _____ acknowledge that
(print name)

- I have read and understood the definitions of academic *integrity* on the University of Saskatchewan's website (http://www.usask.ca/integrity/);
- I have read and understood the definitions of academic *dishonesty* on the University of Saskatchewan's website (http://www.usask.ca/integrity/);
- I have read and understood the "Responsible Conduct of Research" which can be found on the Natural Sciences and Engineering Research Council of Canada's website (http://www.nserc-crsng.gc.ca/NSERC-CRSNG/Governance-Gouvernance/rcr-crr_eng.asp);
- I have read and understood the Code of Ethics found on Page 10 of the Engineering and Geoscience Professions Regulatory Bylaws (section 20), which can be found at the Association of Professional Engineers and Geoscientists of Saskatchewan (APEGS) website. (http://www.apegs.ca/Portal/Sites-Management/FileDownload/DataDownload/775/Regulatory%20Bylaws-revised%20July%202011/pdf/1/1033);
- I am aware of the university's policies and procedures for cases of academic dishonesty and the penalties that could be imposed. This information can be found on the University of Saskatchewan's website (http://www.usask.ca/integrity/).

I,_____, agree to abide by these policies.
(print name)

Signed: _____
(signature)

Student Number: _____

Date: _____

Please submit the completed and signed form to the Graduate Assistant in 2B60.

APPENDIX B:

Advisory Committee Report Guidelines

Department of Mechanical Engineering
Guidelines for First MSc and PhD Advisory Committee Progress Report
Last Revised: September 23, 2019

This document contains information on the Department of Mechanical Engineering's expectations for the first MSc and PhD Advisory Committee report. While a student's Advisory Committee is ultimately responsible for reviewing this report when they evaluate a student's progress in their graduate program, this document also contains some guidelines and suggestions for completing an Advisory Committee report. You should also check with your supervisor(s) as they may have some additional expectations for what should be included in this report. Some supervisors may also suggest attaching additional information to the report. For example, if you have completed a conference paper or report, it could be included as an Appendix of the report.

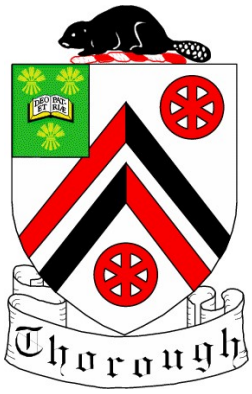
The main purpose of the first MSc/PhD Advisory Committee report is to identify your research objectives and to present your plan for the remainder of your MSc/PhD program. As this is your first Advisory Committee meeting, this report should document your research proposal, including the motivation for your research, your objectives and the research methodology you propose to use. This will allow your Advisory Committee to provide meaningful feedback and suggestions to you on your proposed research.

The first PhD Advisory Committee meeting will also serve as the Qualifying Examination. The purpose of the qualifying exam is to satisfy the academic unit that the student has the potential to obtain sufficient knowledge of the chosen general field of study to proceed toward candidacy for the PhD degree. The Qualifying Examination will consist of a written report (i.e., the first PhD Advisory Committee report), oral presentation and oral examination.

Attached is a template for the format for the first MSc/PhD Advisory Committee progress report for graduate students in the department. Also included is additional information on how to complete each section. It is hoped that these guidelines will make it easier for students to prepare reports that clearly and concisely outline their proposed research, their progress and their plans for the coming year. This will also help your Advisory Committee to provide meaningful feedback to students.

General Guidelines

- MSc reports should be a maximum of ten pages, not including your list of references, the title page and the overview of student's progress page(s). PhD reports may be slightly longer than ten pages if necessary. Do not feel obligated to submit a ten page report. A concise, well-written report that contains the important and relevant information is preferred to a long, verbose report that is poorly written and contains unclear or irrelevant information.
- You should use Times Roman, 12 point font, 1.5 line spacing with margins of 25 mm (1 inch) on all four sides of the page.
- Pages should be numbered consecutively beginning with the Introduction.
- Your progress report must be submitted electronically to megrad.support@usask.ca.
- Your progress report should be submitted in pdf format. Please use the following convention: lastname_firstinitial_AC1report_year.pdf (e.g., Smith_D_ AC1_2019.pdf).



University of Saskatchewan

Department of Mechanical Engineering

MSc/PhD Advisory Committee Report #1

I.M. Student (ID ????????)

Submitted to:

Prof. X. YYY (Supervisor)
Prof. X. YYY (Role: Regular AC Member, Chair, Cognate, …)
Prof. X. YYY (Role: Regular AC Member, Chair, Cognate, …)

Date of Report: Month day, year
Due date: April 30, 2017
Meeting: Month day, year Time, Room #

UNIVERSITY OF SASKATCHEWAN

College of Engineering

Overview of Student Progress in Program

(maximum 2 pages)

Name: A. Student

Email: A.Student@usask.ca

Graduate Program: MSc or PhD

Date Started in Program: month, year

Thesis/Project Title: ??? (provide a title for your thesis or project)

Courses Taken/Grades:

ME 8??	Course Name??	Grade??
ME 8??	Course Name??	Grade??
ME 8??	Course Name??	Grade??
ME 8??	Course Name??	Grade??
ME 8??	Course Name??	Grade??
GSR 960 (and 961, 962 if required)		

Average Grade to Date: **??.?**

ME 990 Seminar: provide date of presentation or state TBA

Major Activities Since Beginning Program:

1.
2.
…

Major Activities Planned for This Year:

1.
2.
…

List of Equipment Required for Research:

1.
2.
…

Expected Completion Date: month, year

Publications/Presentations:

List journal articles published, accepted or submitted, along with conference publications. For conference publications, you should underline the name of the presenter.

1. Introduction (maximum length: 1 page)

- Provide a description of the general mechanical engineering problem you are working on in your thesis research.
- As the members of your Advisory Committee may not be intimately familiar with your research area, it is a good idea to provide some context for your research in the opening paragraph.
- Subsequent paragraphs can be used to provide more detail on the specific problem you are working on.
- This section should help to answer questions such as: "why are you doing this research?"; "What is your aim?"; "What major question are you answering?"; and/or "What is your hypothesis?".

2. Previous Research (maximum length: 3 pages)

- Provide a brief review of previous research that is relevant to your thesis research problem. This section may include the following subsections:

2.1 Literature Review

  - Briefly describe the major research in your thesis research area.
  - Briefly describe the current state of the art in your thesis research area.

2.2 Previous Research at the University of Saskatchewan (if applicable)

  - Briefly describe previous and ongoing research in your research group, and its relationship to your thesis research.

- As much as possible, you should be providing a critical literature review to your Advisory Committee members. In other words, your literature review should not just report on what has been done previously, but should also identify what other investigators have not considered and the limitations of previous research. What are the holes in the current state of knowledge in your research area?
- This section should help to answer the question "what has been done previously?" It should also help you convince your readers that further research is necessary in this area.
- As you are preparing your first Advisory Committee report, you may be just beginning your research. Therefore, this literature review is not expected to be exhaustive, or to be the same

as the literature review you will present in your thesis. Instead, it should just focus on the literature that you have reviewed to date.

3. Expected Research Contributions (maximum length: ½ page)

- In this section, you should briefly describe any contributions that your thesis research is expected to make to your specific area of research and/or engineering practice.
- A MSc student is not required to make a novel contribution to the scientific literature, but a PhD student is required to make an original scientific contribution that advances knowledge.
- Scientific contributions are especially important for PhD students. PhD students should clearly present their expected scientific contributions considering the existing scientific literature.

4. Objectives (maximum length: ½ page)

- In this section, you should briefly describe the objectives of your research. Objectives:
    - describe what you expect to achieve in your thesis research,
    - explain the way in which the research question or hypothesis will be answered,
    - often start with infinitive verbs such as to identify, to establish, to compare, to develop, etc,
    - need to be detailed enough that AC can evaluate whether you have achieved objectives at end of project, and
    - should be detailed enough that you and your Advisory Committee can evaluate whether or not you have achieved these objectives at the end of your research project.

5. Major Tasks (maximum length: ½ page)

- In this section, you should briefly describe the major tasks you will need to complete in order to achieve the objectives.
- Major tasks describe the main steps that are necessary for you to achieve your research objectives. These major tasks should be presented in such a way that they follow logically from the objectives. Two examples are: “to conduct a specific experiment on a specific materials at a specified range of conditions” and “develop a specific model for a specific situation”.

6. Methodology (maximum length: 2 pages)

- Briefly describe the techniques you will use to complete your major tasks and achieve your research objectives and why you decided to choose these particular techniques.
- Here are some pieces of specific information you may wish to provide to your advisory committee on experimental research:
    - What specific equipment will you use?
    - Is this a well-established technique? Is there a test standard that you will follow? If so, will there be any differences between your methodology and the standard?
    - Is this equipment available in the department? If not, how will you access it?
    - Is this the first time this equipment has been used by your research group?
    - How will you learn to use the equipment? Who will train you to use the equipment?
    - How long will it take you to learn how to use the equipment?
    - Is this equipment currently operational? When was the last time it was used?
    - How many tests will you conduct? How long does each test take?
    - You should also provide a sketch or photograph of your experimental apparatus.
- Here are some pieces of specific information you may wish to provide to your advisory committee on analytical/numerical research.
    - What specific techniques will you use? Is the development of these techniques part of your research objectives?
    - What is the theoretical basis for your technique?
    - How will you implement your analytical/numerical techniques (e.g., spreadsheet, write your own computer code, use an in-house or commercial code)? Does your research group have adequate computer resources for your purposes?
    - If you are using a commercial code, is this code currently available through your supervisor or the department/college?
    - How will you validate and verify your analytical/numerical results? If you will be using experimental results, where will you get these experimental results from (e.g., literature, previous research in your group, run your own tests)?

- This section should answer the question “how will you achieve your research objectives?”

7. Progress (maximum length: 1-2 pages)

- Elaborate on the major activities since the beginning of your graduate program. This should include a brief description of experimental and numerical research, and some of the key results you have obtained.
- You do not need to list courses taken in this section, as this information is already provided in the Overview of Progress.
- This section should concentrate on the highlights of your research. If you would like to include more detailed results, you can refer to publications you have written over the past year, such as conference papers or reports and include them in the Appendix. While there is no guarantee that your Advisory Committee members will have time to read these publications in preparation for the meeting, it is good to include them in the Appendix. You can also include these results in your presentation at the beginning of the Advisory Committee meeting.

8. Schedule (maximum length: 1 page)

- Provide a schedule of completion for your MSc/Phd program. This may be in the form of a Gantt chart or other visual representation, which identifies the major tasks (e.g., specific objectives) and milestones (e.g. completion dates for individual tasks). In developing your schedule, you should work backwards from your expected completion date and note the following.
    - The department's expectation is that a MSc program should be completed in two years and a PhD program should be completed within four years.
    - Even if your examining committee requires you to only complete minor revisions on your thesis, this may still take one to two weeks of full-time work.
    - The College of Graduate Studies and Research (CGSR) requires a minimum of three (M.Sc.) or four (Ph.D.) weeks between receiving notification that the thesis has been approved for defence by the advisory committee and the defence date. Your Advisory Committee requires at least two weeks to review your thesis in order to determine whether or not it can proceed to the defence.
    - Please also note the deadlines established by CGSR for completion of defence and paperwork for the spring and fall convocations.

- Briefly list the major tasks you will be concentrating on over the next year.
- Briefly note any anticipated difficulties in your planned research (e.g., equipment currently under repair, acquisition of software), including those related to scheduling (e.g., sabbaticals, exam periods).

9. Conclusions (maximum length: ½ page)

- A brief concluding section should be included, which summarizes your research proposal.

10.References (start on separate page)

- Your reference list and citations should be properly formatted using a style that is commonly used in your research area. Please check with your supervisor(s) to see if they have a particular format that they would prefer. At this point, you may wish to consider what reference style you will use for your thesis and begin to use this format when preparing this document.
- Properly citing references is an important skill for all graduate students, and is often an area in which engineering graduate students have little previous experience. Information on citing references can be found on the University of Saskatchewan Secretary's website (http://www.usask.ca/university_secretary/honesty/Citation Resources.php) and the University Library's website (http://library.usask.ca/howto/index.php).
- You can also check particular journals in your research area for examples of the popular reference formats used in your research area. Most journals also post this information on their websites.

APPENDIX C:

Example Advisory Committee Report

(the Department of Mechanical Engineering would like to thank Dr. Adesola Olufade for his permission to provide this sample AC report to graduate students)

University of Saskatchewan

Department of Mechanical Engineering

MSc/PhD Advisory Committee Report #2

OLUFADE, Adesola Oluwasijibomi (??????)

Submitted to:

Prof. Carey Simonson (Supervisor)
Prof. Richard Evitts (Cognate)
Prof. David Torvi (Regular Member)
Prof. David Sumner (Regular Member)

Date of Report: June 27, 2017
Meeting: July 25, 2017; 9:00 – 11:00 AM; ENGR 2A15

UNIVERSITY OF SASKATCHEWAN

College of Engineering

Overview of Student Progress in PhD Program

Name: OLUFADE, Adesola Oluwasijibomi

Email: ??????@mail.usask.ca

Graduate Program: Ph.D.

Date Started in Program: Month, Year

Thesis Title: Experimental Characterization of Crystallization Fouling in Liquid-to-Air Membrane Energy Exchangers

Courses Taken/Grades:

ME 8??	Name of First Course	??
ME 8??	Name of Second Course	??
GSR 960	Introduction to Ethics & Integrity	CR

Average Grade to Date: ??

ME 990 Seminar: Month Date, Year

Major Activities Since Beginning of the Program:

1. A graduate seminar was presented and the Best Presenter Award was won.
2. A test facility was developed to study fouling in a liquid-to-air membrane exchanger.
3. Two of the four objectives of my PhD research have been addressed.

Major Activities Planned for This Year:

1. Write my PhD comprehensive examination.
2. Write two journal papers to address the third and fourth objectives of my PhD research.
3. Write a manuscript-style PhD thesis.

Expected Completion Date: Month, Year

Publications/Presentations:

1. A. Olufade, C. Simonson, 2016, Quantitative detection of crystallization fouling in a liquid-to-air membrane energy exchanger, in: 16th Aachener Membr. Kolloquium, Aachen, Germany, November 2 – 3, 2016, pp. 105–113.
2. A.O. Olufade, C.J. Simonson, 2017, Detection of crystallization fouling in a liquid-to-air membrane energy exchanger using quantitative methods, Experimental Thermal and Fluid Science (*submitted*).
3. A.O. Olufade, C.J. Simonson, 2017, Impact of crystallization fouling on the moisture transfer resistance of a liquid-to-air membrane energy exchanger, in: International Conference on Heat Exchanger Fouling and Cleaning XII, Madrid, Spain, June 11 – 16, 2017, pp. 67–74.

1 Introduction

Fouling is a perennial problem in several industries. Fouling is simply defined as the deposition and accumulation of unwanted substances on the surface of a material. Fouling affects diverse engineering equipment, especially heat exchangers and membrane modules. Heat exchanger fouling occurs when particles attach to the heat transfer surface and reduce the overall heat transfer coefficient of heat exchangers [1]. Membrane fouling results in the deposition of particles on the surface of a membrane or within the membrane pores, and can reduce the permeation rate through the membrane [2].

Fouling results in severe economic consequences, because of the costs that arise from extra power requirements, material purchase/replacement, maintenance, and downtime [3,4]. It has been estimated that the costs associated with fouling constitutes about 0.25% of the gross domestic product of developed countries [5], which is approximately $5 billion CND for Canada in 2015, using data from The World Bank Group [6].

Although fouling adversely impacts a wide range of industries such as water treatment, food processing, steam and power generation, mining, oil and gas, etc., this PhD research focuses on fouling in the heating, ventilation and air-conditioning (HVAC) industry. This is because HVAC systems consume approximately half of the energy used in buildings, and up to one-fifth of the total energy consumed in developed countries [7]. Furthermore, the global demand for cooling energy is projected to increase by a factor of 30 by 2100 [8]. Consequently, addressing the problem of fouling in HVAC systems will help reduce global energy consumption and contribute to environmental sustainability.

2 Previous Research

A brief review of previous studies on fouling is presented in this Section. The key research gaps in the literature that will be addressed in the thesis are also outlined.

2.1 Fouling detection methods

Although fouling cannot be entirely eliminated, it can be controlled. In order to effectively control fouling, it is important to able to monitor existing systems to identify the occurrence of fouling. Consequently, diverse methods have been developed to detect fouling, and an

overview of these fouling detection methods is shown in Figure 1. Invasive methods normally lead to the interruption of a process (e.g. taking apart a heat exchanger) or destruction of materials (e.g. dissecting a membrane sample) when they are used to detect fouling. However, invasive methods directly confirm the presence or absence of fouling because they can fundamentally examine for the presence of fouling. On the other hand, non-invasive methods are more attractive for practical applications because they are suited for the online detection and monitoring of fouling without disrupting operational systems or equipment.

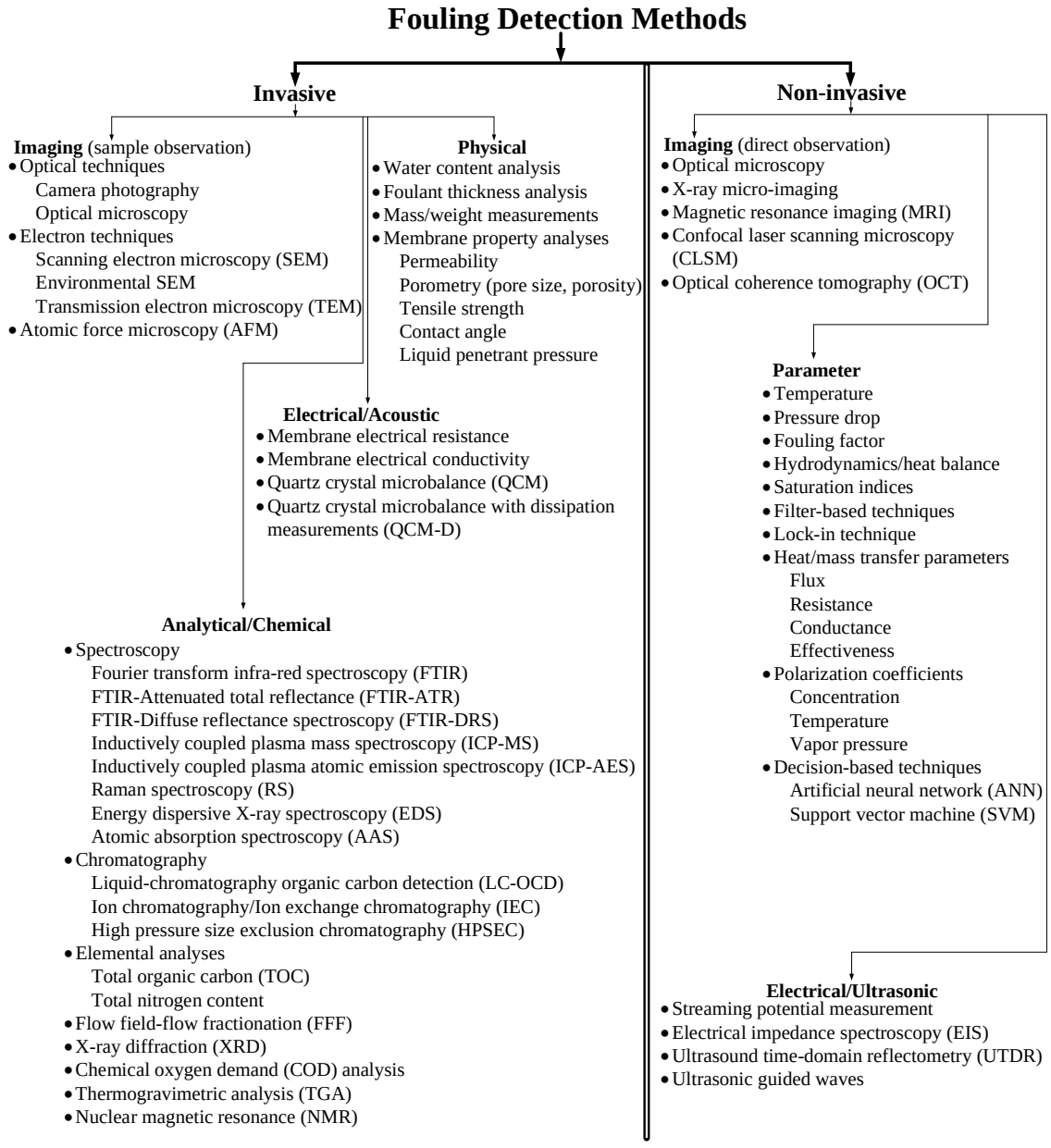


Figure 1. Fouling detection methods (compiled from Refs. [3,9–38]).

The application of non-invasive methods for online system monitoring can help to i) detect fouling early thereby preventing excessive damage to equipment, ii) ensure timeliness and effectiveness of cleaning and maintenance operations, and iii) minimize financial losses [37]. Although some studies have investigated non-invasive fouling detection methods for different applications (e.g., dairy production in Ref. [29] and domestic water heating in Ref. [22]), no study has systematically applied and evaluated non-invasive methods for the timely detection of fouling in membrane-based HVAC systems.

2.2 Fouling in membrane-based HVAC systems

Recently, there has been a gradual increase in the adoption of membranes in HVAC systems, because membranes can be used to condition air by enabling the exchange of heat and moisture between air and fluid streams. However, membranes can become clogged with deposits which block the membrane pores or form a layer on the surface. Although fouling can significantly deteriorate the performance of membrane-based HVAC systems, the fouling formation mechanisms and dynamics are yet to be explored [39]. In addition, the need to conduct in-depth research on fouling in membrane-based HVAC systems have been suggested in Refs. [39,40].

So far, only three studies on fouling in membrane-based HVAC applications have been found in the literature [9,11,41]. Charles and Johnson [9] evaluated the impact of liquid-side crystallization fouling and air-side particulate and biological fouling on the performance of a membrane-based evaporative cooling module. The results showed that crystallization fouling had a significant adverse impact on membrane performance and decreased the evaporation rate through the membrane by ~95% after a test that lasted for approximately 100 hours. The autopsy of fouled membranes that was performed using scanning electron microscopy (SEM) revealed the presence of mineral precipitates in the membrane pores.

Crawford and da Silva [11] assessed the impact of mineral fouling on the performance of a membrane unit for passive evaporative cooling. The test results showed that the continuous evaporation of water from the feed solution created crystallization on the membrane surface and reduced moisture permeation through the membrane by ~92% within 14 hours. A camera was used to record time-lapse images of the spread of salt crystal formation on the membrane surface. Furthermore, the SEM technique was used for membrane analysis, and it showed that the pores of fouled membrane samples were blocked by precipitated salt crystals compared to fresh membranes.

Engarnevis et al. [41] experimentally evaluated the impact of particulate fouling on the performance of air-to-air membrane energy recovery ventilators (ERVs) in tests that lasted for nearly 8 hours. Their results showed that coarse dust particles increased fan energy consumption, but slightly improved the sensible and latent effectiveness of the ERVs. This was attributed to a possible enhancement in heat/mass transfer due to a reduction in boundary layer thickness and turbulence. Furthermore, nano-particles were used to foul ERVs at dry conditions and subsequently exposed to humid air. A slight reduction (<5%) in moisture flux through the membrane was only observed when the particles caused thick depositions on the membrane surface. A greater reduction (~15%) in moisture flux through the membrane was observed when the ERVs were fouled with hygroscopic nano-particles, but the membrane performance was unaffected when the ERVs were fouled with non-hygroscopic nano-particles.

Engarnevis et al. [41] primarily addressed particulate fouling in air-to-air membrane ERVs, whereas Crawford and da Silva [11] and Charles and Johnson [9] both focused on crystallization fouling in LAMEEs. Although Ref. [9] also partially investigated air-side particulate and biological fouling, these fouling modes were reported to have a relatively limited impact on the performance of membranes compared to crystallization fouling. Consequently, this thesis focuses on crystallization fouling which is the dominant fouling mechanism in LAMEEs, due to the high propensity for scale formation in water or liquid desiccants.

The two papers (Refs. [9,11]) that addressed crystallization fouling in LAMEEs were extremely limited in scope. Several aspects of fouling characterization such as sensitivity analysis, fouling evolution and elemental analysis of fouling deposits were not assessed. This thesis addresses these outstanding research gaps through a comprehensive investigation of crystallization fouling in LAMEEs. The specific gaps are listed in Section 2.3.

2.3 Research gaps

The research gaps that have been identified from the literature and addressed in this thesis are as follows:

1. Development and application of non-invasive methods to detect fouling in LAMEEs.
2. Comprehensive characterization of crystallization fouling in LAMEEs:
   Sensitivity Analysis
   a. Examination of fouling detection in LAMEEs that use liquid-desiccants.
   b. Investigation of different operating conditions that result in fouling.
   c. Evaluation of the impact of moisture transfer rate on fouling.
   d. Evaluation of the impact of membrane resistance on fouling.
   Growth/Kinetics
   e. Evaluation of fouling resistance and its regimes.
   f. Delineation of the evolution of fouling growth in membranes.
   Elemental Analysis
   g. Identification and quantification of membrane foulant composition.

3 Thesis Contributions

This thesis is expected to provide original contributions to the scientific literature on the following points:

1. Non-invasive methods are developed and applied to detect fouling in LAMEEs.
2. Crystallization fouling mechanisms in LAMEEs will be discovered:
   a. Fouling is detected in LAMEEs that use liquid-desiccants.
   b. The operating conditions that result in fouling are evaluated.
   c. The impact of moisture transfer rate on fouling is evaluated.
   d. The impact of membrane resistance on fouling is evaluated.
   e. Fouling resistance is quantified and its regimes are identified.
   f. The evolution of fouling growth in membranes is characterized.
   g. The composition of membrane foulants are identified and quantified.

4 Thesis Objectives

The objectives of this thesis are to:

1. Develop non-invasive methods to detect crystallization fouling in LAMEEs.
2. Identify operating conditions that result in crystallization fouling in LAMEEs.
3. Identify the evolution of crystallization fouling in membranes using both invasive and non-invasive methods.
4. Model the kinetic growth dynamics of crystallization fouling in membranes.

5 Methodology

The main methodology adopted in this thesis is experimental because the thesis involves the fundamental study of fouling detection and growth. Experimental tests are conducted to identify and characterize crystallization fouling in a LAMEE at different operating conditions, and the data analysis of the test measurements is presented.

5.1 Experimental test facility

A test facility was developed to study crystallization fouling in membranes at conditions that simulate the operation of LAMEEs in HVAC systems. The LAMEE in the test facility is a double-pipe energy exchanger that uses a membrane to separate an air stream and a stagnant liquid stream. When the LAMEE is used to dehydrate desiccant solutions, moisture evaporates from the desiccant solution and permeates through the membrane to the air stream. As water evaporates from the desiccant solution, the concentration of the solution at the membrane interface may increase and result in supersaturation.

If supersaturation is attained either at the membrane interface or in the bulk solution, crystals may nucleate on defective sites on the membrane surface. As the test progresses, the crystals grow and agglomerate and deposit on the membrane surface or lodge within the membrane pores. Consequently, the rate of moisture transfer through the membrane will decrease because the crystal formations serve as a resistance to moisture permeation through the membrane.

The schematic of the test facility is shown in Figure 2. The test facility consists of an upstream section, a LAMEE and a downstream section (Figure 2**a**). Sensors are installed at the upstream and downstream sections of the LAMEE to measure the properties of air before and after the LAMEE. The side-view cross-section of the LAMEE and profile of holes in the inner pipe of the LAMEE are shown in Figure 2(**b**) and (**c**), respectively. Holes are drilled through the inner pipe to allow the exchange of moisture between the air and desiccant solution streams, because the pipe is impermeable to moisture transfer.

The measurement sensors were calibrated before and after experimental testing were conducted. A full uncertainty analysis was performed, and mass/energy balances were assessed to be within ±20%. The details of the test facility operation, instrumentation specifications, uncertainty analysis, and mass/energy balances are documented in the Appendix.

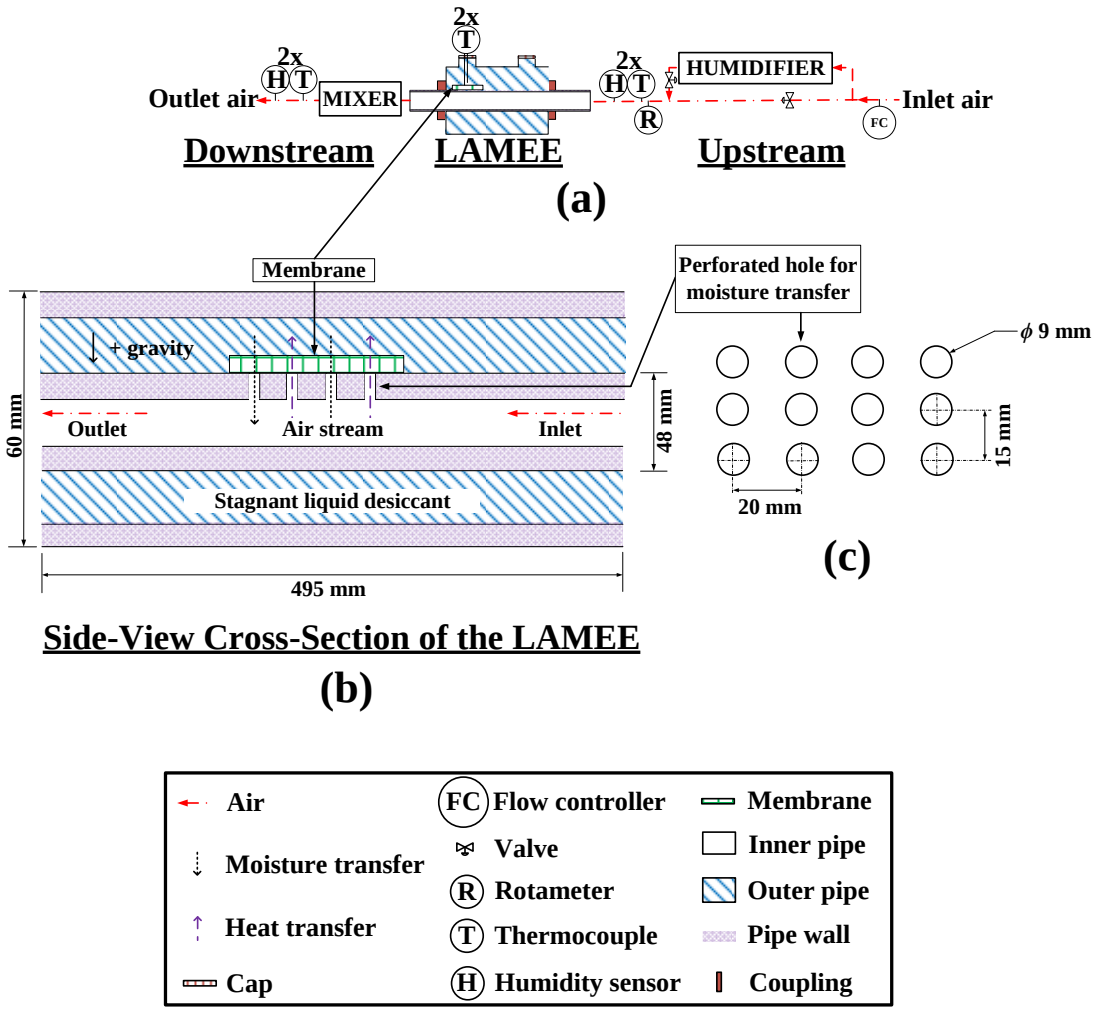


Figure 2. Schematic of the (a) test facility, (b) side-view cross-section of the LAMEE, and (c) top view showing the arrangement and dimensions of perforated holes on the inner pipe of the LAMEE. **Note.** The diagrams are not drawn to scale.

5.2 Data Analysis

The measurement data is analyzed to examine the occurrence of crystallization fouling in LAMEEs and delineate the evolution of fouling growth in membranes. Non-invasive methods are used to address the first two thesis Objectives, whereas the third thesis Objective is addressed using both invasive and non-invasive methods. The fourth thesis Objective will be accomplished using a combination of empirical coefficients developed from the non-invasive methods and appropriate heat/mass transfer correlations.

5.2.1 Non-invasive methods

As previously stated, the main advantage of non-invasive fouling detection methods is their ability to detect and monitor fouling without interrupting the system operation. However,

imaging and electrical/ultrasonic non-invasive methods (*see* Figure 1) suffer from certain setbacks such as limited resolution when working with transparent liquids or membranes, limited application to certain fouling deposits or membrane units, expensive hardware and large space footprints [26]. On the other hand, parameter-based non-invasive methods can overcome the aforementioned limitations, after they have been verified with other methods.

Heat/mass transfer flux and resistance have been widely used to analyze fouling by several researchers (Refs. [36,42–44]). If the boundary conditions in a unit are maintained, fouling would expectedly lead to a decay in flux or increase in resistance. However, flux and resistance computations may be unreliable to confirm the occurrence of fouling or the time of fouling occurrence, because the change in the flux or resistance may be lower than the measurement uncertainty. Consequently, flux and resistance results are usually supplemented with other fouling detection methods.

Ref. [44] reported that crystallization fouling reduced the permeate flux of a membrane distillation module, and confirmed the results by using SEM and contact angle measurement techniques. Ref. [43] fouled a heat exchanger with calcium carbonate solution and reported a linear increase in its thermal resistance. The study of Ref. [43] also presented the uncertainty of the thermal resistance and observed the fouling deposits ex-situ using the SEM technique. However, these techniques were not compared to determine if or when fouling occurs in the heat exchanger.

In this thesis, three parameter-based methods will be applied to detect fouling in LAMEEs. The three methods are outlined as follows:

1. Uncertainty

   The uncertainty method confirms the occurrence of fouling if the change in the flux or resistance (ϕ) exceeds the corresponding uncertainty within a moving window, as given by:

$$\left| \frac{\Delta\phi}{\text{Uncertainty}_{\Delta\phi}} \right| > 1 \qquad (1)$$

2. Statistical

   The statistical method is used to assess the difference between the flux or resistance for two tests (one test without fouling versus another test where the occurrence of fouling is being examined). Fouling occurrence is confirmed by comparing the statistical

difference (t-test ($t_{Computed}$)) between the two tests to the critical *t*-value within a moving window, as given by:

$$\left|t_{\text{Computed}}\right| - t_{\text{Critical}} > 0 \tag{2}$$

3. Slope

   The slope method confirms that fouling has occurred if the slope of flux or resistance exceeds the corresponding uncertainty in the slope within a moving window:

$$\left|\frac{\text{Slope}}{\text{Uncertainty}_{\text{Slope}}}\right| > 1 \tag{3}$$

   It should be noted that the slope of flux or resistance as a function of time remains constant at zero at steady state conditions when there is no fouling.

5.2.2 Invasive methods

In this thesis, invasive methods will be applied to detect crystallization fouling in LAMEEs, and the results will be compared with findings from non-invasive methods. The specific applications of these methods are outlined as follows:

1. Examination of the occurrence of crystallization fouling in LAMEEs.
   Fouled membrane samples will be imaged with optical microscopy (OM) and SEM techniques ex-situ, and the observation of crystal deposits on fouled membranes can be used to confirm the occurrence of fouling.

2. Delineation of the evolution of crystallization fouling in membranes.
   Experimental tests will be performed for different time durations, and the SEM technique will be used to determine the time at which fouling begins. The changes in the morphology of crystal deposits for different tests will also be assessed.

3. Characterization of membrane foulant composition.
   The energy-dispersive X-ray spectroscopy (EDS) technique will be used to identify and quantify the elemental composition of crystal deposits on fouled membranes.

6 Progress

Two papers have been submitted and orally presented at international conferences. In addition, two journal papers have been written and one of them has been submitted. A brief overview of the journal papers are documented in the following Sub-Sections.

6.1 First journal paper

The first journal paper addresses the first two thesis Objectives. The first thesis Objective is addressed by examining the occurrence and time of fouling for one membrane using two non-invasive methods (uncertainty and statistical methods) to analyze the changes in flux. The key findings of this paper with respect to the thesis are that 1) crystallization fouling can be detected in a LAMEE with the methods implemented, and 2) operating conditions can accelerate or limit crystallization fouling in a LAMEE. A representative result from the paper is shown in Figure 3.

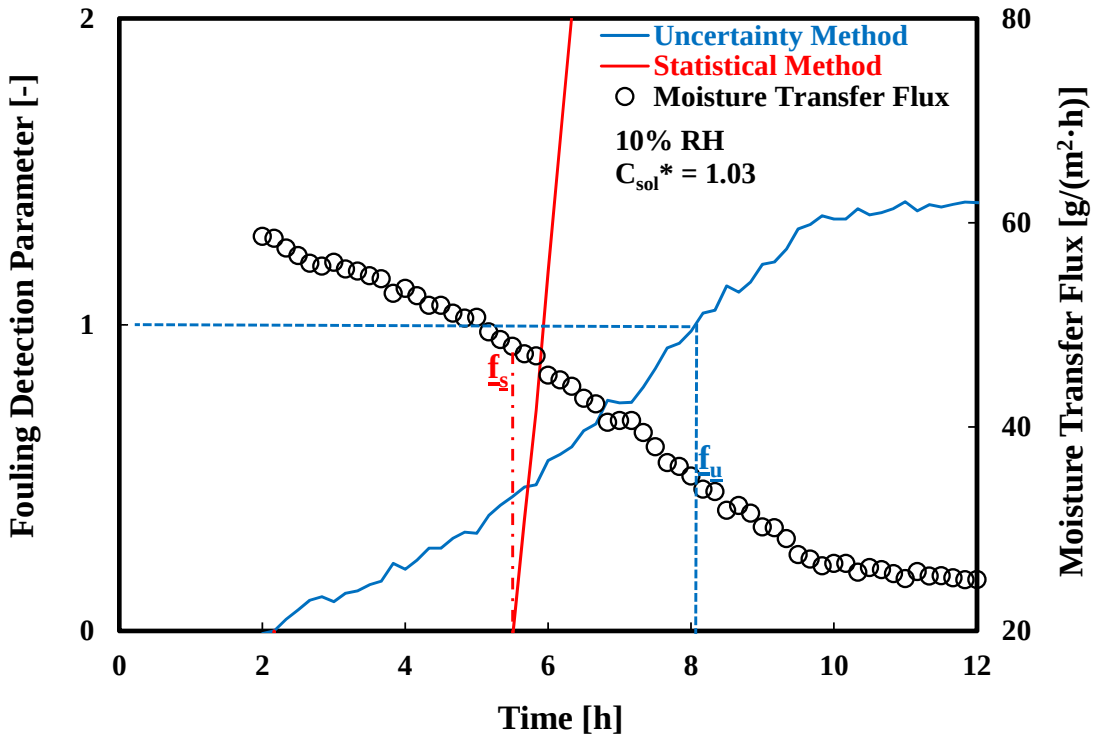


Figure 3. Comparison of moisture transfer flux and fouling detection parameter for a test with $MgCl_2$(aq) at RH_{air} = 10%, C_{sol}* = 1.03. The time of fouling detection for the statistical and uncertainty methods are denoted with ($\underline{f_s}$) and ($\underline{f_u}$), respectively. RH_{air} = Air relative humidity, C_{sol}* = Normalized solution concentration. C_{sol}* = 1.0 at saturation. **Note.** The first journal paper has been submitted to *Experimental Thermal and Fluid Science* and is included in its entirety in the Appendix.

The left vertical axis of Figure 3 shows that there is a ~60% decay in the moisture transfer flux through the membrane during the 12-hour test. The reduction in flux is probably due to the rapid nucleation of crystals on the membrane which is aided by the supersaturated state of the

bulk solution (C_{sol}* = 1.03). On the right vertical axis, the uncertainty method confirms fouling at the reference cut-off of 1, whereas the statistical method confirms fouling at the reference cut-off point of 0. The statistical method is able to detect fouling within the first 5.5 hours of the test, whereas the uncertainty method detects fouling at 8 hours. Although both methods can detect fouling at this operating condition, the statistical method is more sensitive to the changes in flux.

6.2 Second journal paper

The second journal paper also addresses the first two thesis Objectives. However, additional analyses are performed and further contributions to the literature are achieved. This paper addresses the first thesis Objective by applying three non-invasive methods to analyze the changes in both flux and resistance to examine the occurrence and time of fouling. In addition, the performance of the three methods is compared for several operating conditions for two different membranes. The key findings of this paper with respect to the thesis are that the paper: 1) is able to compare the sensitivity of the three methods in terms of versatility, simplicity and sensitivity, 2) clearly shows the impact of membrane properties on the fouling rate in membranes, and 3) shows that resistance is more sensitive than flux for detecting the changes that occur due to fouling in the LAMEE. Figure 4 shows a result from the paper.

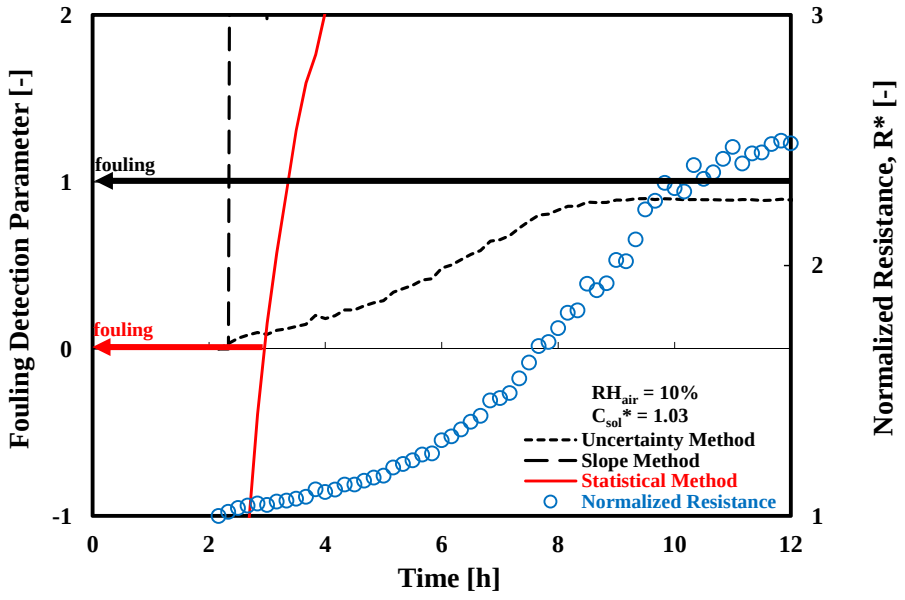


Figure 4. Comparison of normalized moisture transfer resistance and fouling detection parameter for a test with $MgCl_2$(aq) at RH_{air} = 10%, C_{sol}* = 1.03. **Note.** The second journal paper will be submitted to *International Journal of Heat and Mass Transfer* in July 2017 and is excluded from this Report.

The right vertical axis of Figure 4 shows that the resistance of the LAMEE increases during the 12-hour test by over a factor of 2. This can be attributed to the supersaturation of the bulk solution (C_{sol}* = 1.03) which possibly led to the precipitation of crystals in the membrane as moisture evaporates from the desiccant solution. The accumulation of crystals in the membrane impeded the permeation of moisture and increased the resistance of the LAMEE. On the left vertical axis, both the uncertainty and slope methods confirm fouling at the reference cut-off point of 1, whereas the statistical method confirms fouling at the reference cut-off point of 0. The slope method is the most sensitive since it able to detect fouling within ~2 hours whereas the statistical method detects fouling at 2.5 hours. Although a rapid increase in resistance is observed in Figure 4, the uncertainty method is unable to detect fouling and is the least sensitive of the three methods.

7 Schedule

It is envisaged that the thesis will be completed on time and defended within 3.5 years. The major tasks of the PhD program are presented in Table 1.

Table 1. Gantt chart of PhD program schedule.

No	Task Detail	Timeline							
		2015		2016		2017		2018	
		1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half
1	Courses	■	■						
2	Literature review	■	■	■	■	■	■		
3	Construction of test facility		■	■					
4	Writing of first journal paper				■	■			
5	Writing of second journal paper					■			
6	Comprehensive examination						■		
7	Writing of third journal paper						■		
8	Writing of fourth journal paper							■	
9	Writing of thesis and Supervisor's review							■	
10	Thesis defense							■	

8 Conclusions

In this Report, the background and motivation for this PhD program were presented. The research gaps in the literature and the potential contributions of the thesis were identified. The thesis Objectives address the research gaps identified. The adopted research methodology, experimental test facility and data analysis were briefly explained, and reference was made to additional information in the Appendix.

Furthermore, the Report documents the progress of this program by highlighting the objectives and key findings of two journal papers which both address the first two thesis Objectives. Finally, the schedule and timeline of the PhD program was depicted on a Gantt chart showing that the next steps are to conduct invasive tests (OM, SEM and EDS analyses of fouled membranes) to confirm the non-invasive methods presented in the first and second journal papers.

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Appendix

This section originally contained the submitted version of the first journal paper of my PhD research. The paper itself has been briefly described in Section 6.1 of the Report.

The paper has been accepted by Experimental Thermal and Fluid Science *journal, and can be accessed at: https://doi.org/10.1016/j.expthermflusci.2017.10.017.*

APPENDIX D:

Second MSc Advisory Committee Report Template

Department of Mechanical Engineering
Guidelines for Second MSc Advisory Committee Progress Report
Last Revised: September 23, 2019

This document contains information on the Department of Mechanical Engineering's expectations for the Second MSc Advisory Committee report. The main purpose of completing this second report is to briefly document the progress you have made towards your research objectives since your last Advisory Committee meeting, and to present your plan for the coming year, including your expected completion date.

While MSc students are required to complete a 5-10 page report for their first Advisory Committee meeting, students only need to complete the attached Overview of Progress section for their second report (maximum two pages).

This report should be completed by the end of the 20th month in the program

Your Advisory Committee will use this short report to evaluate the progress you have made and to determine whether a face-to-face Advisory Committee meeting is necessary. If your Advisory Committee decides that a face-to-face Advisory Committee meeting is required, this meeting will be scheduled during the same time period as meetings for students who are having a first MSc Advisory Committee meeting (May for students who began in September, September for students who students who began in January and January for students who began in May).

Attached is a template for Second MSc Advisory Committee progress reports for graduate students in the department. **This template is not intended to be used by PhD students**. PhD students may continue to use the first MSc/PhD Advisory Committee report guidelines throughout their program but are not required to follow the page limits specified in the first MSc/PhD Advisory Committee report guidelines.

General Presentation Guidelines

- Your entire progress report should be a maximum of two pages.
- You should use Times Roman, 12 point font, 1.5 line spacing with margins of 25 mm (1 inch) on all four sides of the page.
- Your second progress report must be submitted to your supervisor for their approval and signature. Your supervisor can also provide comments on your progress and schedule for completion.
- Once your supervisor has signed the report, please submit the report to megrad.support@usask.ca and it will be forwarded the members of your Advisory Committee.
- Your progress report should be submitted in pdf format. Please use the following convention: lastname_firstinitial_AC2_year.pdf (e.g., Smith_D_ AC2_2019.pdf).

Overview of Progress Since Last Advisory Committee Meeting

(maximum 2 pages)

Name: A. Student

Email: A.Student@usask.ca

Graduate Program: M.Sc.

Date Started in Program: month, year

Date of Previous Advisory Committee Meeting: month day, year

Thesis/Project Title: ??? (provide a title for your thesis or project and indicate if this title has changed since the last advisory committee meeting)

Courses Taken/Grades:

ME 8??	Course Name??	Grade??
ME 8??	Course Name??	Grade??
ME 8??	Course Name??	Grade??
ME 8??	Course Name??	Grade??
ME 8??	Course Name??	Grade??
GSR 960 (and 961, 962 if required)		

Average Grade to Date: **??.?**

ME 990 Seminar: provide date of presentation or state TBA

Major Activities Since Beginning Program:

1.
2.
…

Major Activities Planned for This Year:

1.
2.
…

List of Equipment Required for Research:

1.
2.
…

Schedule for Completion:

Please provide a brief overview of the main tasks remaining to be completed along with the date by which you expect to complete each task. Please include the date you expect to submit your thesis to your advisory committee for approval to go to the thesis defence.

Reasons for delays:

If you do not expect to complete your MSc program within 24 months from the date started in program, provide a brief explanation as to the reasons why (e.g., problems with equipment).

Publications/Presentations:

List journal articles published, accepted or submitted, along with conference publications. For conference publications, you should underline the name of the presenter.

Supervisor Comments:

Space should be left for your supervisor to provide comments and to sign the report.

Name of Supervisor	Signature of Supervisor	Date