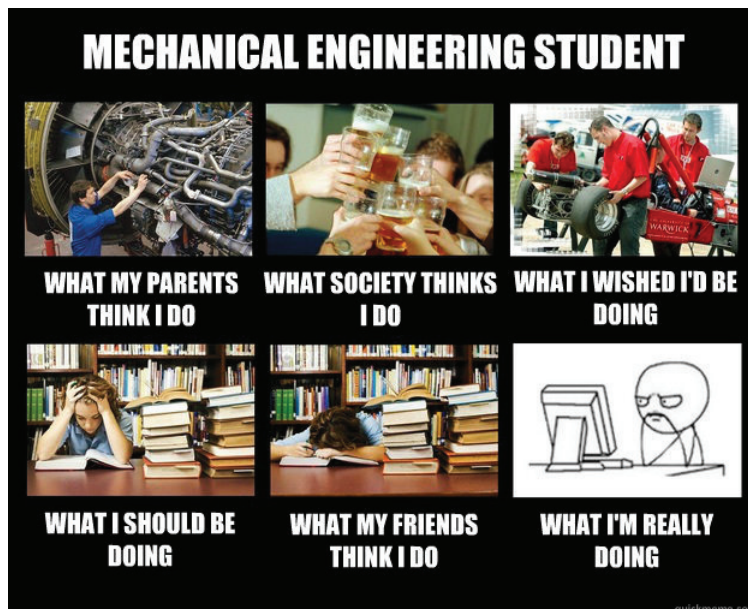




*Presents*

*The Mech Survival Guide:  
A brief introduction to Debauchery, All-Nighters  
and Mad \$tack\$*

*Cause you want to graduate at some point?*



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# Chapter 1

## Introduction

Welcome to Mechanical Engineering...we promise these will be the best four (or five) years of your life!

Before we actually get into how you survive and thrive in this program, we would like to formally welcome you to the department of Mechanical Engineering here at McGill. By becoming a part of our department, you have decided to join a dedicated group of undergraduates who come from a wide array of different social and academic backgrounds, linked by the common goal of one day earning their degree in Mechanical Engineering. However, before you get your iron ring and walk across that stage, you need to make it through four (or five) years as a mechanical engineering undergraduate. We are not going to sugar coat it...making it through this program is definitively tough. But, never forget, you need not brave it alone! We, as well as a variety of other great undergraduate student organizations, teams, and clubs, do our best to ensure that you will succeed and still have fun despite the academic rigor and demand of our curriculum. Additionally, there are cool and exciting opportunities offered both by the department and the faculty that can allow you to do some pretty amazing things.

As a consequence of the work of all these different groups, there is no shortage of opportunities and resources available to you as a member of both our department and the Faculty as a whole. And, as awesome as it is that all these things are at your disposal, you may find this abundance initially overwhelming. With all these things vying for your attention and participation, you may find it difficult to locate appropriate and/or helpful resources. Alternatively, you may not know what you are looking for, and like some place to start. It is with these problems in mind that we decided to create the "MAME Survival Guide".

The purpose of this document is to act as a lightweight, easy to read central resource for pertinent social, academic, and professional information. Our goal here was NOT to try not to explain every detail of every piece of information about mechanical engineering at McGill, for fear of just generating more useless clutter. Instead, we aimed to keep everything as clear and concise as possible, just enough so that you get the main idea of what things are. Then, if you wish to learn more, we provide you with the appropriate links and resources to do so. Additionally, this document contains knowledge that has been obtained from upper years students and presents it in a condensed and organized fashion.

While after working through this document you may not know every single thing there is to know about Mechanical Engineering at McGill, we guarantee that you will be well informed enough to utilize many valuable resources within the department and the faculty, as well as a leg up from an academic and professional standpoint to those who have not read this document. Thus, without further ado, I present to you "MAME Survival Guide."

\*NOTE: all text throughout this document that is in *italics* is a clickable hyperlink to an appropriate online resource to find more information.

## Chapter 2

# Survival Guide to: Student Life

- *What is MAME?, Where is MAME?, why is there a MAME?*
- *What is EUS? EUS Services such as Frostbite, Copi-EUS, etc. (Mention that you can get old final & review notes Copi-EUS).*

### 2.1 MAME

- **MAME** is an acronym that stands for the McGill Association of Mechanical Engineers. It refers to all undergraduate students currently enrolled in the department of Mechanical Engineering.
- The MAME council is the governing body of the MAME. This group of 12 elected officials provide social, academic, and professional events specifically for mechanical engineering undergraduates.
- The MAME office is located in McConnell 120. This is where you will be able to find a MAME officer who you may voice an department related concern or ask a question. This is also a really cool place to hang out in between classes if you are looking to play some Gamecube or just have a good conversation.
- MAME's overarching goal is to improve the undergraduate engineering students' experience. Through academic, social, or professional events, we are here to help and make your time at McGill a smooth and unforgettable ride.

### 2.2 EUS

- ***EUS: Engineering Undergraduate Society***  
The Engineering Undergraduate Society of McGill University, Inc. (EUS) is a non-profit corporation which responds to the needs of undergraduate engineering students at McGill. We have over 150 volunteers spread over 45 committees which serve students in a variety of ways. Our mission is not only to ensure that the engineering undergraduate community is adequately represented to faculty, other student associations and to external organizations;

but also that each and every engineering undergraduate student feels part of a community and is proud of their future profession.

- **Services**

- ***Frostbite***  
Frostbite: Ice Cream ft. Toonie-Tuesdays .
- ***Copi-EUS***  
Copi-EUS: Old exams and all of your printing needs.
- ***G-Store***  
General Store: School Supplies, candy, and other necessities.
- ***3D Printing***  
Additive Manufacturing Lab open to students.
- ***Blue's Pub***  
A place to grab a beer with your friends on Friday.
- ***EUS Wiki***  
A site is dedicated to helping you better navigate the EUS.

## 2.3 Getting Involved

The EUS prides itself on its number of incredible and passionate groups of students working together to form the clubs, committees and teams that bring our engineering community together. With such a diverse collection of groups, there is always a place for you to get involved!

There are four categories in which these teams are classified: Club, Committee, Competition, Design Team and Event.

### 1. Clubs

- McGill is proud to offer a large variety of clubs to all of their students. These clubs, started by other McGill students, range from philanthropic activities, discussing food, to being part of a national/international branch. Clubs are not directly supported by the EUS and therefore can operate independently. Clubs are, however, held accountable for their operations by the VP Clubs Admin as well as the Clubs Council.

## 2. Committees

- Committees are some of the most important operational entities in the EUS and one of the best ways to get involved! Committees concentrate the wide varieties of interests and passions into specific bodies with specific mandates. Committees range from event planning to promoting diversity, inclusion and social equity in engineering at McGill.

## 3. Competitions

- CAD Madness: Want to flex your 3D modeling muscles and win some money while doing it? CAD madness takes teams of four, presents them with a design goal, and gives them 24 hours to 3D model their interpretation. Teams will be judged on their ability to CAD, originality, theoretical ability to manufacture, and cost effectiveness. The winner of the competition will receive a cash prize and have their design built and put into use.

- **M.E.C.:**

The McGill Engineering Competition, is a yearly design/building competition that truly tests your engineering and/or consulting skills. The competition is broken down into six categories

- Senior Design
- Junior Design
- Innovative Design
- Engineering Communication
- Re-Engineering
- Impromptu Debate

The winning teams will be invited to participate in Q.E.C. (Quebec Engineering Competition) against other schools within Quebec

- **M.E.C. Lite:**

A smaller version of M.E.C. held in a different semester than M.E.C. with three categories

- Junior Design
- Consulting
- Sustainability

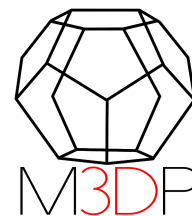
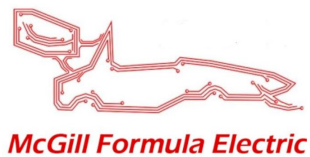
- **Eng Games:**

”Engineering Games (EngGames for short, or Jeux de Genie, JDG in French) is an intercollegiate community comprised of undergraduate engineering students in Quebec united through year-round social events, competitions, challenges, projects and a general sense of comradery. Members of this community are invited to a series of events hosted at many of the 10 participating universities and meet for one final event, known as The Games, held annually from 3rd to 7th of January. The Games are the grand unifying summit of EngGames’ existence and are composed of a series of challenges at which each university’s delegation competes head to head for a chance to crown their delegation as victors”.

#### 4. Design Teams

- Looking to apply what you have learned in the classroom to real world engineering problems? McGill is proud to be the home of 9 top-class engineering based design teams. Join hundreds of fellow students as they put their engineering skills to the test to build rockets, racecars, robots, and other engineering marvels. Design teams gives you, the student, the opportunity to travel the world, compete against other schools, all while adding something awesome to your resume/CV.

\*NOTE: Click on the team's logo to learn more about what they do. You can also find the teams on Facebook or within the [EUS Wiki](#). Also, keep a look out for recruitment events at the beginning of each semester.





## 2.4 Food and Coffee

When you're hungry or thirsty, there's many places on- and off-campus to meet your needs. There's many other restaurants and shops, but here are a few notable ones frequented by Engineering students. By clicking, you will be linked to a *Google Map* displaying the location.

### Food

[\*McConell E-Caf\*](#)

[\*Lola Rosa\*](#)

[\*Tim Hortons\*](#)

[\*Basha\*](#)

[\*Thai Express\*](#)

[\*Cafe Java U\*](#)

[\*Pizza Navona\*](#)

### Coffee

[\*G-Store\*](#)

[\*McConell E-Caf\*](#)

[\*MAME Office\*](#)

[\*Tim Hortons\*](#)

[\*Café Milton Bistro\*](#)

[\*Van Houtte\*](#)

[\*Starbucks\*](#)

[\*Pikolo Espresso Bar\*](#)

[\*The Humble Lion\*](#)

[\*Première Moisson\*](#)

## Chapter 3

# Survival Guide to: Academics

### 3.1 Academic Services

As a member of our department, you will have a variety of different resources available to help you finish an assignment, write a paper, or study for an exam. This section aims to briefly describe the most helpful ones.

- ***EPTS:***  
is an acronym that stands for the Engineering Peer Tutoring Service. This service employs experienced undergraduate engineering student tutors to help you with all U0 and U1 math courses, and a selection of 200 level MECH courses. They are located in the Frank Dawson Adams Building, Room 6B, and their tutoring hours are available on their calendar.
- The ***Burnside 911:***  
is located in the Burnside Building, room 911. This service employs experienced undergraduate math tutors to help with any math courses you need help with. While the tutors do not specialize in engineering math courses like those at EPTS, it is a good secondary resource to go to
- The ***McGill Writing Center:***  
is located in the McLennan-Redpath Library, room 2. This service offers professional assistance for any academic or course related writing you may have. This service is especially helpful for classes such as FACC 100 and CCOM 206.
- **MAME Tutorials:**  
are offered by MAME and aim to provide last minute preparation before a midterm or final exam. They are usually taught by the TA for the course the review session is covering, and come at no cost to you. IF there is a class that you would like to request a review session in, please do so by sending an email to [mame.vpacademic@mcgilleus.ca](mailto:mame.vpacademic@mcgilleus.ca)
- **Office Hours:**  
are provided by both TAs and professors for nearly every class in our curriculum. Depending on the quality of the TA and professor, the quality and helpfulness of these office hours are mixed. However, it is advisable to attend office hours at least once for every class to determine

whether or not this is a helpful resource to go to in the event you get confused or lost. It should also be noted that the individual's office hours you attend should be dependent on what information you are hoping to gain:

- *TA Office hours*-TA office hours should be attended when you have questions related to specific tutorial, assignment, or practice problems. Considering TAs are often the ones generating assignments and tutorial content, it makes sense that they would be incredibly helpful in helping you solve these problems.
- *Professor Office Hours*- Professors office hours should be attended when you have questions regarding lecture content, course logistics, or broad questions related to the course material. If your questions are only related to practice or assignment problems, it is often better to go straight to the TA because it is likely that you may be showing this problem to the professor for only the first or second time, meaning their answer may not be clear and concise. However, if you are curious about overarching concepts in a course or even material that is not covered in the course but you are still interested in, the professor is often the person to ask. Additionally, if you want to work for this professor or get a good letter of recommendation from him, it is imperative that you regularly attend his or her office hours.

## 3.2 Study Tips and Resources

For most of you, unless you are a transfer student, taking university courses will be a new experience. Oftentimes homework is not collected/graded and you can be tested on things not directly covered in class. From the first course you take until you walk out of your last final exam, McGill is pushing you to be life long learners and problem solvers. With that in mind, we at MAME would like to offer some study tips and excellent resources to help you on your path.

- **Start Early:**  
McGill assignments are notorious for being very time consuming but extremely applicable when it comes to quizzes and exams. Take the time to fully understand the material and how it applies to other problems is a huge factor to success
- **Working In Groups:**  
Engineering never is and never will be a discipline that should be done alone. Taking advantage of the group study spaces within the Schulich library or renting a room is an excellent way to make friends and get work done.
- **Using Solutions With Caution:**  
Finding solutions to assignments or past exams can be a powerful study tool. That being said, proceed with caution. Before you look at the solution, give the problem an honest try, fail if you must, and learn from your mistakes. It is very easy to convince yourself that you understand the problem just because you understand the solution.
- **Attend Class:**  
Getting up for 8 : 35 am courses is a challenge but not attending will not only result in falling behind, but it can also lead to missing crucial information. Often times professors will drop hints about exams and you definitely don't want to miss those.

### 3.3 Minor Programs

Several *Minor Programs* are available to complement the B.Eng (Bachelor of Mechanical Engineering) program. The potential minors are listed below with their associated credit requirement and the advisor to contact should you choose to pursue one.

### 3.4 Concentrations

Apart from selecting a minor, if you choose to accompany your B.Eng degree, two technical concentrations are available:

*Aeronautical*  
and  
*Design*

In order to start enrolling in classes within your selected concentration, you must fill out a *Request for Course Authorization Form*. This form ties your selected program to your degree....(B.Eng with a concentration in Aeronautics/Design) and gives you permission to enroll in specific courses.

Concentrations give upper year students the opportunity to take higher level courses (Mech 400 level and above) in their area of interest. Many of these courses are at the masters level. If you wish to continue onto a higher level degree at McGill some conflicts may arise. Some of these courses satisfy a masters level requirement in their respective programs and if you take them as an undergrad, the credits may not transfer to a masters program. If in doubt speak to your advisor at *MESC*.

\*NOTE: As these courses are higher level, many of them will fulfill the required technical complimentary courses outlined in the syllabus.

### 3.5 Exchange- Studying Abroad

Studying abroad is a once in a life time experience and should be seriously considered by all MAME students.

*Applying for an Exchange in 5 Simple Steps*

\*NOTE: It is highly recommended that you meet with an advisor at *MESC* before applying and if you receive acceptance to your institution(s). McGill's course requirements may not be 100% satisfied or some of the courses you may need are not offered. Failing to look could delay graduation because course requirements are not met.

### 3.6 Courses

*A quick outline of all of the Mech courses*

Table 3.1: Required Mechanical Department Courses

| Code     | Name  | Credits | CEGEP Entry (NA) | Difficulty (1-3) |
|----------|---|---------|------------------|------------------|
| MECH 201 | Introduction to Mechanical Engineering      | 2       |                  | 1                |
| MECH 210 | Mechanics 1                                 | 2       |                  | 1                |
| MECH 220 | Mechanics 2                                 | 4       |                  | 3                |
| MECH 240 | Thermodynamics 1                            | 3       |                  | 2                |
| MECH 262 | Statistics and Measurement Laboratory       | 3       |                  | 1                |
| MECH 290 | Design Graphics for Mechanical Engineering  | 3       |                  | 1                |
| MECH 292 | Design 1: Conceptual Design                 | 3       |                  | 1                |
| MECH 309 | Numerical Methods in Mechanical Engineering | 3       |                  | 3                |
| MECH 314 | Dynamics of Mechanisms                      | 3       |                  | 1                |
| MECH 315 | Mechanics 3                                 | 4       |                  | 2                |
| MECH 321 | Mechanics of Deformable Solids              | 3       |                  | 2                |
| MECH 331 | Fluid Mechanics 1                           | 3       |                  | 2                |
| MECH 341 | Thermodynamics 2                            | 3       |                  | 2                |
| MECH 346 | Heat Transfer                               | 3       |                  | 2                |
| MECH 360 | Principles of Manufacturing                 | 3       |                  | 1                |
| MECH 362 | Mechanical Laboratory 1                     | 2       |                  | 1                |
| MECH 383 | Applied Electronics and Instrumentation     | 3       |                  | 2                |
| MECH 393 | Design 2: Machine Element Design            | 3       |                  | 2                |
| MECH 412 | System Dynamics and Control                 | 3       |                  | 3                |
| MECH 430 | Fluid Mechanics 2                           | 3       |                  | 2                |
| MECH 463 | D1 Design 3: Mechanical Engineering Project | 3       |                  | 2                |
| MECH 463 | D2 Design 3: Mechanical Engineering Project | 3       |                  | 2                |

Table 3.2: Required Non-Department Courses

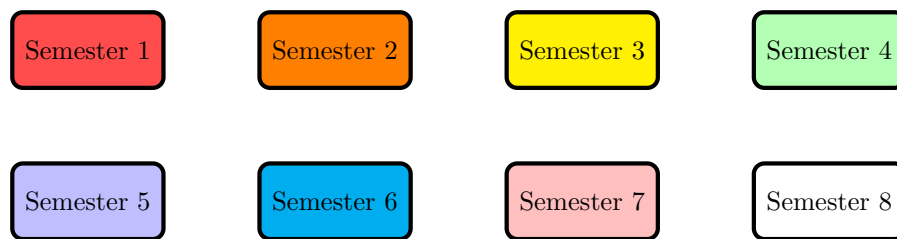
| Code     | Name  | Credits | CEGEP Entry (NA) | Difficulty (1-3) |
|----------|---|---------|------------------|------------------|
| CCOM 206 | Communication in Engineering                      | 3       |                  | 2                |
| CHEM 110 | General Chemistry 1                               | 4       | X                | 1                |
| CHEM 120 | General Chemistry 2                               | 4       | X                | 1                |
| CIVE 207 | Solid Mechanics                                   | 4       |                  | 2                |
| COMP 208 | Computers in Engineering                          | 3       |                  | 2                |
| ECSE 461 | Electric Machinery                                | 3       |                  | 3                |
| FACC 100 | Introduction to the Engineering Profession        | 1       |                  | 1                |
| FACC 300 | Engineering Economy                               | 3       |                  | 2                |
| FACC 400 | Engineering Professional Practice                 | 1       |                  | 1                |
| MATH 133 | Linear Algebra and Geometry                       | 3       | X                | 1                |
| MATH 140 | Calculus 1  | 3       | X                | 1                |
| MATH 141 | Calculus 2  | 4       | X                | 1                |
| MATH 262 | Intermediate Calculus                             | 3       |                  | 1                |
| MATH 263 | Ordinary Differential Equations for Engineers     | 3       |                  | 2                |
| MATH 264 | Advanced Calculus for Engineers                   | 3       |                  | 1                |
| MATH 271 | Linear Algebra and Partial Differential Equations | 3       |                  | 3                |
| MIME 260 | Materials Science and Engineering                 | 3       |                  | 1                |
| PHYS 131 | Mechanics and Waves                               | 4       | X                | 1                |
| PHYS 142 | Electromagnetism and Optics                       | 4       | X                | 1                |

### 3.7 Mechanical Engineering Course Flow Chart

# The Mechanical Engineering Course Flow Chart





## Tile Color

The color of the tile will represent the recommended semester to take the course. If you plan a semester containing all the same color courses, you are on stream and guaranteed to graduated in the 8 semesters. It is possible to graduate, on time, if you mix tile colors and move off stream. But be cautious, for taking courses out of stream may conflict with one another.



## How To Read The Arrows

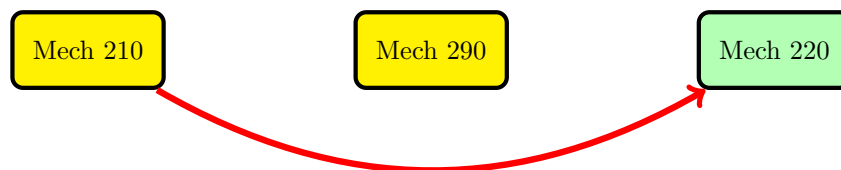
If an arrow points to a course, the origin of the arrow is the pre-requisite to the arrow's destination. If a course does not have an arrow pointing to it, no pre-requisite is required. The color of the arrows represent the relative level of difficulties between the two courses.

-  Decrease In Difficulty
-  Same Level Of Difficulty
-  Increase In Difficulty
-  Significant Increase In Difficulty

## A Few Things To Keep In Mind As You Follow The Flow Chart

- Taking same color courses per semester means that you are on track.
- It is possible to mix colors and graduate on time.
- If a course does not have an arrow pointing to it, it does not require a pre-requisite.
- If an arrow points to a course, the origin of that arrow is a pre-requisite.
- Keep in mind that difficulty ratings are relative to one another.
- Not all courses are offered in both semesters. You must check Minerva to confirm course availability.
- Levels of difficulties are based upon anecdotal evidence and peer review.

### Example

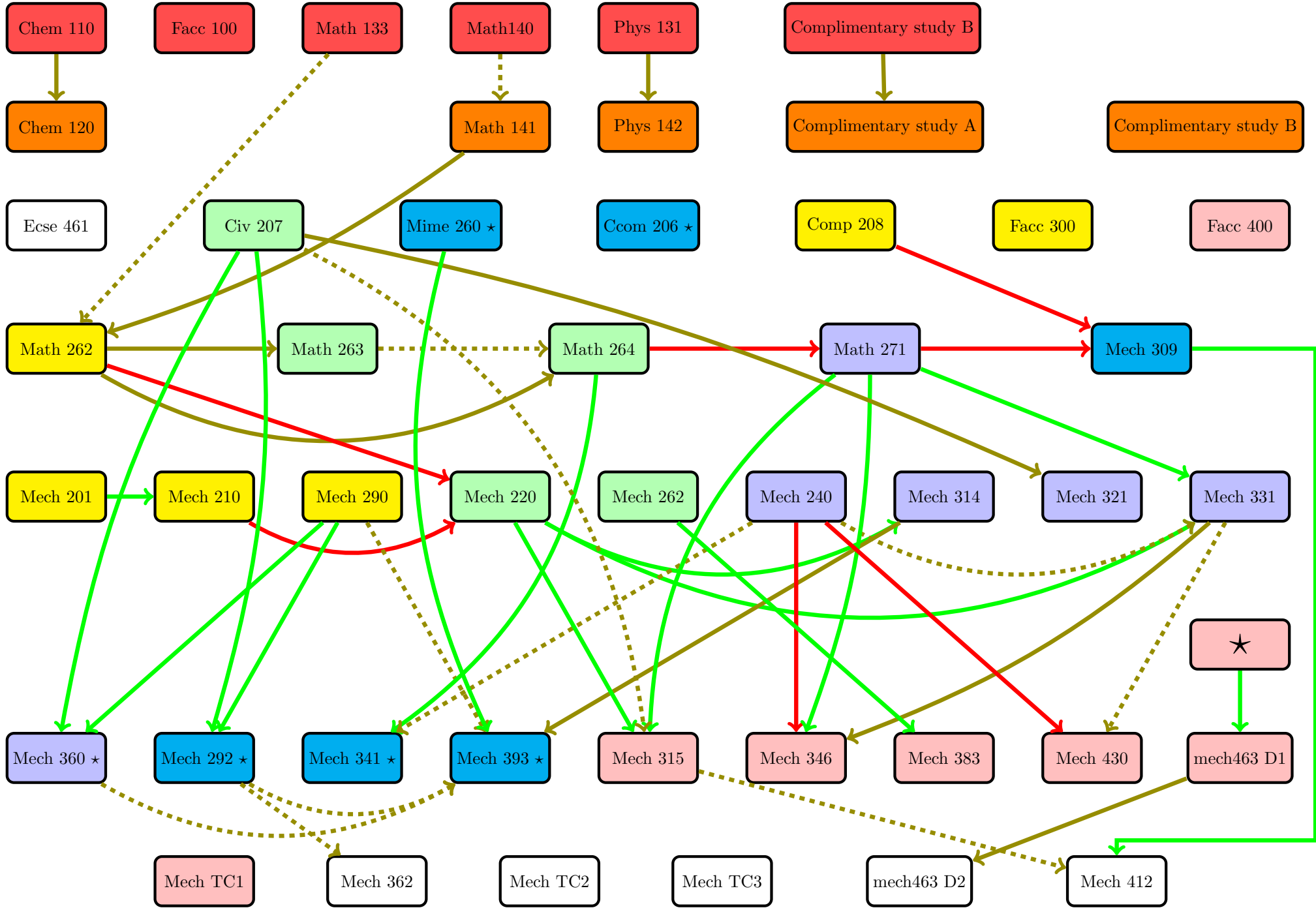


As you can see, Mech 210 and Mech 290 do not have any arrows pointing to them thus, no pre-requisite is required. Since an arrow is pointing to Mech 220, Mech 210 is a pre-requisite for that course. The red arrow signifies there is a significant increase in the level of difficulty between the two courses.

### The Purpose Of This Flow Chart

Success in engineering is all about balance. Being responsible enough to prioritize properly will be key to your success. McGill recommends a stream of courses that will guarantee a 4 year graduation. This flow chart will give you a visual representation of the curriculum path. Its purpose is to prepare you for the difficulties and time commitments ahead of you. As you work through the chart, **click the course title** for a short description.





## Departmental Courses

### **Chemistry 110: General Chemistry 1**

An introductory chemistry course that will be taken with other McGill faculties. You will learn the fundamentals of atomic structure, radiation, nuclear chemistry etc... This course has a lab section as well.

[Return to flowchart](#)

### **Chemistry 120: General Chemistry 2**

Your secondary chemistry course that covers the basic theory behind physical chemistry and organic chemistry. This course has a lab section as well.

[Return to flowchart](#)

### **Physics 131: Mechanics and Waves**

An intensive course that covers Newtonian mechanics, oscillations, and waves. This course has a lab section as well.

[Return to flowchart](#)

### **Physics 142: Electromagnetism and Optics**

The study of the basic laws of electricity and magnetism; geometrical optics. This course has a lab section as well.

[Return to flowchart](#)

### **Complimentary Study B**

A course outside the scope of your engineering education.

[Return to flowchart](#)

### **Complimentary Study A**

A course outside the scope of your engineering education.

[Return to flowchart](#)

### **Complimentary Study B**

A course outside the scope of your engineering education.

[Return to flowchart](#)

### **Comp 208: Computers in Engineering (Computer Engineering Faculty Course)**

The study of the concepts and structures for high level programming. The course introduces the coding language C, Fortran and Matlab. You will be responsible for submitting coding projects written in C.

[Return to flowchart](#)

### **Civ 207: Solid Mechanics (Civil Engineering Faculty Course)**

A solid mechanics course which is fundamental to your understanding of material properties. You will study stress-strain relationships; elastic and inelastic behaviour; performance criteria, Mohr's circle, etc... This course has a lab section as well.

[Return to flowchart](#)

### **Mime 260: Materials Engineering (Mining and Materials Engineering Faculty Course)**

Complimentary to your understanding of material properties, Mime 260 dives deeper into the fundamental elements of material behavior. You will be studying the structural properties and fabrication of metals, polymers, ceramics, composites, etc... This course has a lab section as well.

[Return to flowchart](#)

### **Ccom 206: Communications in Engineering (Communications Faculty Course)**

Being able to communicate your ideas clearly, concisely, and to a large variety of audiences is a crucial skill for any engineer. Ccom 206 breaks down the techniques for effective and proper communication in both speaking and writing

[Return to flowchart](#)

### **Ecse 461: Electric Machinery (Electrical Engineering Faculty Course)**

Electric machinery is constantly integrated into many mechanical designs. In this course you will develop a fundamental understanding of how various power machinery operates.

[Return to flowchart](#)

## Faculty Courses

### **Facc 100: Introduction to Engineering**

Being a practicing engineer comes with interpersonal and professional expectations. In this course you will cover engineering practice; rights and code of conduct for students; professional conduct and ethics; etc...

[Return to flowchart](#)

### **Facc 300: Engineering Economy**

If you decide to enter industry, often times, your engineering work may be intertwined with financial limitations. In Facc 300 you will be introduced to the basic concepts required for the economic assessment of engineering projects.

[Return to flowchart](#)

### **Facc 400: Engineering Professional Practice**

In Facc 400 you will be exposed to the laws, regulations and codes governing engineering professional practice.

[Return to flowchart](#)

## Math Courses

### **Math 133: Linear Algebra**

Math 133 is your first introduction to linear algebra. It involves matrix arithmetic, determinants, eigenvalues and other fundamental concepts that are used heavily in later math and mechanical courses. This is definitely a course to make sure you have a firm grasp on.

[Return to flowchart](#)

### **Math 140: Calculus 1**

If you are new to calculus this introductory course reviews limits, continuous functions, and other fundamental pre-calculus concepts. This course also introduces derivatives and its applications.

[Return to flowchart](#)

### **Math 141: Calculus 2**

A challenging course that requires lots of practice; math 141 introduces integration. You will cover undefined integrals, defined integrals, trigonometric integrals, geometrical integrals, etc... All other math courses rely heavily on this course.

[Return to flowchart](#)

## **Math 262: Intermediate Calculus**

This intermediate calculus course focuses on series, sequences, and introduces Taylor series. Later in the course you will begin work on partial differentiation and some vector calculus.

[Return to flowchart](#)

## **Math 263: Ordinary Differential Equations**

A very fundamental math course, math 263 is a study of ordinary differential equations. Understanding and being able to solve ordinary differential equations is a powerful tool for modeling engineering systems. You will finish the course working with Laplace transforms.

[Return to flowchart](#)

## **Math 264: Advanced Calculus**

Math 264 is an advanced calculus course that focuses, primarily, on vector calculus and its applications. You move through multiple integrals, into classic vector calculus theorems, and finishing with a brief introduction to partial differential equations.

[Return to flowchart](#)

## **Math 271: Linear Algebra and Partial Differential Equations**

One of the most challenging and rewarding math courses that McGill has to offer. Math 271 combines linear algebra with partial differential equations. Many applicable engineering systems are governed by the systems that you will encounter. It requires a lot of work and patience but the work is equal to the reward.

[Return to flowchart](#)

## **Mech 309: Numerical Methods**

Mech 309 is a math based mechanical engineering course which incorporates computer science, math, and engineering. Many engineering models do not have analytic solutions and Mech 309 gives you the tools to apply numerical methods to these models. This course requires Matlab: a mathematics based computational coding environment. Take this course seriously.

[Return to flowchart](#)

## Mechanical Courses

### **Mech 201: Introduction to Mechanical Engineering**

A fantastic first introduction to your mechanical engineering program. This class takes you through all the amazing things you will be learning and has a team-based engineering project competition at the end. We highly recommend that you take this course during your first year.

[Return to flowchart](#)

### **Mech 210: Mechanics 1 (Statics)**

Mech 210 is a statics based engineering course. You will be exposed to Newton's laws and how they apply to engineering systems. You will practice taking complex systems and breaking them down using free body diagrams.

[Return to flowchart](#)

### **Mech 220: Mechanics 2 (Dynamics)**

Moving from statics to dynamics, Mech 220 introduces particle dynamics and kinematics. Later, you will study principles of energy and momentum and their usefulness in solving engineering systems. It is a challenging course and will take a substantial amount of work to master.

[Return to flowchart](#)

### **Mech 240: Thermodynamics 1**

Thermodynamics 1 is an extremely interesting introduction to the subject. You work through the laws of thermodynamics and how they apply to real engineering systems.

[Return to flowchart](#)

### **Mech 262: Statistics and Measurements Laboratory**

Mech 262 combines lab work with statistical modeling. Being able to properly acquire data from experimentation is an important skill for any engineer.

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### **Mech 290: Design Graphics in Engineering**

One of the most useful skills and engineer can poses is proficiency in 3D modeling. Mech 290 is designed to provide the students with proficiency in Solidworks. Solidworks is a powerful 3D modeling platform that you will use constantly during your time at McGill.

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## **Mech 292: Design 1: Conceptual Design**

Engineering design can be broad and complex. Mech 292, design 1, teaches techniques for optimizing engineering projects. At the end of the course, you and a team of four participate in an design competition.

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## **Mech 314: Dynamics of Mechanisms**

Mech 314 is a graphical representation of the dynamics of bodies. You will spend time studying the dynamics of linkages and other connected bodies.

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## **Mech 315: Mechanics 3: Mechanical Vibrations**

An intensive study into mechanical vibrations, Mech 315 introduces single-degree-of-freedom systems; free vibrations; effect of damping; response to harmonic, periodic and arbitrary excitation and La grange's equations of motion, etc...

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## **Mech 321: Mechanics of Deformable Solids**

An in depth study of material properties beyond the scope of Civ 207, Mech 321 studies the phenomenological theories of the behaviour of engineering materials. Stress and strain concepts and introduction to constitutive theory. You also may be exposed to finite element analysis as well.

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## **Mech 331: Fluid Mechanics 1**

Fluid mechanics is a cornerstone of engineering. Mech 331 derives fundamental fluid mechanical relationships and studies how they govern our surroundings. You will study fluids kinematics and dynamics: stress in a continuum, rates of strain, rotation. Control volume analysis; conservation of mass, linear momentum and energy; Euler and Bernoulli equations.

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## **Mech 341: Thermodynamics 2**

Continuing your thermodynamics study, Mech 341 introduces thermodynamic cycles, real gas effects, psychometric and air conditioning processes, and combustion.

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## **Mech 346: Heat Transfer**

The study of heat Transfer is fundamental to understanding thermodynamic engineering systems. In this course you will be exposed to steady and unsteady heat conduction, Fin Theory, Convective heat transfer: governing equations; dimensionless parameters; analogy between momentum and heat transfer, etc...

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## **Mech 360: Principles of Manufacturing**

As engineers we love to design and build. Understanding machining limitations is fundamental to designing parts. Mech 360 brings you through a large variety of manufacturing techniques and their limitations.

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## **Mech 362: Mechanical Laboratory**

A laboratory based course in: Fluids, Heat Transfer, Thermodynamics, and Mechanical Vibrations. These labs will be completed periodically once its respective course has been passed.

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## **Mech 383: Applied Electronics and Instrumentation**

In this course you will develop an understanding for discrete and integrated components, both analogue and digital. Characteristics of passive elements. Semiconductors, amplifiers, filters, oscillators, modulators, power supplies and nonlinear devices, etc...

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## **Mech 393: Design 2: Machine Element Design**

In this course you will be exposed to the design of machine elements for strength requirements in the consideration of various methods of manufacturing. Synthesis of mechanical systems to fulfill performance requirements, following the engineering design process. Depending on the professor, the course may incorporate a design project.

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## **Mech 412: System Dynamics and Controls**

An extremely interesting course which dives into the fundamentals the modelling of physical linear time-invariant systems using transfer functions. Transient and steady-state response specifications. State space representation of systems. Frequency-response characterization. Stability, feedback control systems, and PID controller design, etc...

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## Mech 430: Fluid Mechanics 2

Your second course in the fundamental of fluid mechanics. Mech 430 deals with the thermodynamics of gases, one dimensional isentropic flow and choking. Nozzles and wind tunnels and Normal shock waves. Flow in constant area ducts with friction and heat exchange. Compressible irrotational flow. Oblique shock waves and Prandtl-Meyer expansion, and supersonic aerofoil and wing theory.

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## Mech 463:Capstone 1

Toward the end of your engineering degree, you and a team of four will utilize all that you have learned to produce a piece of engineering as your final project. **NOTE: THIS COURSE MUST BE TAKEN IN THE FALL SEMESTER**

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## Mech 463:Capstone 2

The continuation of your final project.**NOTE: THIS COURSE MUST BE TAKEN IN THE WINTER SEMESTER**

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## Mech Tech Comp 1

A technical complimentary course.

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## Mech Tech Comp 2

A technical complimentary course.

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## Mech Tech Comp 3

A technical complimentary course.

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Pre-Requisites for Mech 463: Ccom 206, Mech 360, Mech 292, Mech 314, Mech 393, Mime 260

## 3.8 Learning Software

Our mechanical engineering curriculum currently provides a good educational basis in important engineering theory, both in math and science, but when it comes to using software, there still is a lot to be desired. And, the truth of the matter is to be an attractive job or research applicant in any engineering concentration, you need to be software proficient. This means that you should be able to pick up a new coding language or learn a new CAD software relatively quickly. The following selection of software are some of the more useful to know. Online/Youtube guides and tutorials are readily available.

### Coding Software

- **Matlab:**

Matlab an abbreviation for matrix laboratory, is a high throughput computational software with a hige variety of applications. In our curriculum, Matlab is considered a standard software and you are *unofficially* expected to know how to proficiently code in by the time you have finished U1. For this reason, it is imperative that you take the time to look through a variety of resources as well as work through practice problems in order to be prepared to use it for courses like Mech 319 and Mech 412

- **Python:**

Python is one of the most prolific open source software's currently available. Its applications are even more varied than that of Matlab, and the readability of its syntax is said to be superior to many other languages. Python, by itself, is a very sparse language that has few important applications. The versatility of Python comes with the hundreds of open source modules that have been developed for applications. As a mechanical engineering student, probably the three most important Python modules are *numpy*, *scipy*, and *matplotlib*. With these three modules, Python is able to mimic a lage percent of what Matlab is capable of, with relatively similar syntax and logic. The main advantage of Python is it is free, meaning that after you graduate you can still use it without needing an expensive license. While there are no courses that require you to use Python, it is still a fun and interesting language to learn, and would definitely look good to put on a CV

- **C:**

This is one of the oldest languages there is.(40 years old!). While learning this language has no practical application, it is important to learn for simple tasks because it requires you to do more work than a "vary high level" language like Matlab. As a result, you will gain a more fundamental understanding of the underlying architectures of a variety of coding languages

### Computer Aided Design (CAD)

- **AutoCAD:**

AutoCad is considered to be the most rudimentary CADing software's available. Its simplicity, makes it a very user friendly program which is easy to pick up. That being said, its simplicity will limit its applications. This software should really only be used for 2D drawings.

- **SolidWorks:**  
SolidWorks is one of the most versatile and widely used CAD software within professional and educational environments. It is incredibly user friendly and quite fun to use. Its 3D design suites are simple to pick up, and they offer a small collection of simulation software's.
- **ANSYS:**  
ANSYS is an extremely powerful simulation environment/engine. As you work through the mechanical curriculum, you will encounter complex systems that are only solved through iterative mathematical models. ANSYS provides you, the student, with finite element analysis (FEA), computational fluid dynamics (CFD), computational gas dynamics (CGD), etc... engines to tackle some of the most complex modeling problems with a high level of accuracy. There is a slim chance that you will encounter this program within one of your courses but, if you decide to join a design team, chances are you will need to use it.
- **Catia** From the same software developers as Solidworks, Catia is a more a CAD environment more specified for industrial and aerospace engineering. Its environment is similar to that of Solidworks but contains more advanced design and modeling features.
- **NX** Unigraphics NX is another extremely common educational/professional CAD software. NX has more drafting and simulating capabilities, but is definitely more of a challenge to learn than Solidworks

### Miscellaneous Software

- **Microsoft Excel and VBA:**  
Visual Basic for Applications (VBA), is the essential "programming" language for Microsoft Excel. Having a solid knowledge of Microsoft Excel and VBA allows you to manipulate data within excel beyond your wildest dreams. If you plan on joining the *McGill Institute of Aerospace Engineering* and want to get an internship at an aerospace company, being proficient to fluent in VBA is a advantageous.
- **LaTeX:**  
LaTeX is an open-source programming language that allows you to create well formatted documents mainly for academic purposes. LaTeX most likely wont be a requirement, but, if you want to create nicely formatted PDFs (like this one) that really blow people away, LaTeX is the way to go.
- **Adobe Illustrator/Inkscape/Tikz:**  
These three software's are each graphic design platforms used for fun or professional use.

## Chapter 4

# Social Life

### 4.1 Social Events

Without a doubt, your time at McGill will be some of the best. From spending Friday nights at blues pub to the late nights in MD50 working on your assignments, McGill has so much to offer. Before we introduce you to a little bit of the MAME/McGill social life, I'd like to discuss drinking culture

*MAME and McGill as a whole works extremely hard to provide a safe, inclusive, equitable, and welcoming environment. We at MAME and the EUS strive to make sure our students feel like they belong and work towards creating an environment which encourages participation. Therefore, I cant stress enough, that even though enjoying an alcoholic beverage is common at our events, that peer pressure is highly discouraged. We welcome all with open arms, are so happy that you are here, and hope that you join us.*

#### The Inaugural McGill Events

- **Frosh:**

Many of you will begin your McGill journey with frosh. Frosh is an amazing way to meet new friends, learn about McGill, and explore Montreal. Your frosh experience will be guided by your frosh leaders who are your fellow engineers. They are there to answer questions and give you the ins and outs of engineering culture. During night events they are there to bring you to and from your destination safely.

Check out the 2016 Engineering Frosh video [Here](#)

- **Discover McGill:**

Discover McGill, as its name suggests, is a comprehensive tour of McGill, its facilities, and

surrounding area. During the tour you will be ushered into an auditorium where the dean of the engineering school and the EUS president will present a welcome address to all of the incoming students.

### The core of MAME & EUS events

- **Blues PUB:**  
After a hard week of classes nothing is better than spending some quality time with your friends at the weekly engineering pub in the McConnell basement. From 4-9 (Happy hour 4pm-6pm: beer is \$ 1 and non-happy hour: 6pm-9pm beer and other drink prices vary), you can hang out, play some beer-die, enjoy a snack and chat the night away. If you are so inclined, throughout the year you may participate in server training and earn the right to serve beer to your fellow engineers.
- **O.A.P.:**  
The open air pub is an EUS organized event where all of McGill comes to enjoy the sunshine, live music, and share some drinks. O.A.P. is the EUS primary fund raising method and requires a lot of volunteer help. Keep an eye on Facebook for an "O.A.P. Volunteers group" to learn how to get involved.
- **E-Week:**  
Once a year the time comes to prove which engineering faculty is dominant. Each faculty participates in a week long themed tournament with a huge variety of daytime and nighttime events. It is a great chance to bond with your fellow MAMERs and compete with other faculties to win Mech-Week...\*cough \*cough... I mean E-Week.
- **Activities day:** Activities day, held once a semester is the best way to learn about what McGill has to offer. Held in the students society of McGill (SSMU) building, this event spans all floors and hosts a massive variety of clubs, programs, teams, etc... You will walk through the building and meet representatives and have the opportunity to provide your contact information so you can get involved.
- **Halloween events:** The EUS social committee will be planning a variety of Halloween events for everyone to participate in. From dances to a Blues Pub, you don't want to miss these events.
- **Hype Week:** Gather your friends, make a team, dive into the competition, and get hype for what carnival has to offer. This is a McGill wide event
- **Carnival:** Re-assemble your hype week team and party around Montral and compete to crown the superior carnival team  
**EUS Ski Trip:** Hit the slopes and crunch some pow with your fellow engineers. The EUS ski trip will bring you to a mountain for the day and after you will return to your chalet for the night.
- **Faculty Olympics:** Compete against the other McGill faculties to prove who is the best. Day time and night time events are held where participants are encouraged to join and represent McGill Engineering in all of its glory.

- **MERT-W:** Everyone knows that McGill Engineers Rule The World. Prove it by participating in this grand Montreal pub crawl.
- **Volunteer Banquet:** Falling in love with the EUS is easy. So many of us give back to the community and the volunteer banquet recognizes all of the hard work done by clubs, committees, design teams, etc... Awards are given out to a variety of individuals who go above and beyond.
- **MAME banquets:** As semesters come to an end, its the perfect time to get together with your fellow mechies to reflect, enjoy a good meal, and party the night away. A restauraunt is rented out and students and professors alike are invited to join!

These events are only a handful of what McGill has to offer!

## Chapter 5

# Survival Guide to: Industry

### 5.1 Engineering Internship Program

Even though Co-op is not offered to Mechanical Engineering students at McGill, it is highly recommended that students participate in an internship. An internship is a fantastic way to obtain real applicable industry experience and set yourself apart when the time comes to begin your career.

If successfully completed, the *Engineering Internship Program* is a course that recognizes relevant work experience and is displayed on your transcript

To obtain the Internship Program designation, students must complete at least:

- Two 4 month long work terms (industrial practicum) OR
- One 8, 12 or 16 month long internship (2-4 consecutive work terms with the same employer)

#### Where To Find An Internship?

- **McGill CAPS (Career and Planning Services):**

"The McGill Career Planning Service (CaPS) assists students in their career development and search for permanent, part-time, and summer jobs, as well as internships, by providing workshops, individual advising, a comprehensive job posting service, and an extensive Career Resource Centre." An online portal is available where students can find postings:

*CAPS My Future Portal*

- **Networking With Alumni:**

Engineering Alumnus understand the challenges of finding a job/internship. Reaching out to alumni at a company, industry, or location that you find interesting is an excellent way to begin a mutually beneficial: dialogue.

*CAPS Alumni Networking*

- **Resources Outside Of McGill:**

Sometimes the most effective method to securing an internship is contacting a company directly. Contact a human resources coordinator and ask how you can get involved!

## 5.2 Professional Events

Throughout the year, MAME will be hosting a variety of professional events. These events give students the opportunity to meet, face-to-face with industry professional, McGill MAME alumni and recruiters.

- **Industry Dinners:**

A formal opportunity to enjoy a meal and network. These EUS organized events, invite companies from all around to world to engage the students, discuss their careers, and, more often than not, open doors to future employment.

- **Company Information Sessions:**

The EUS is constantly inviting companies to give information sessions. These can be found in the weekly MESC news letters. This is a great way to learn about companies and what your future as an engineer may look like.

- **Practice Interviews:**

Occasionally companies will send recruiters to hold mock interviews. These interviews, technical/interpersonal, can give students an edge before they embark on the real thing. You can find more information on:

*[CAPS My Future Portal](#)*

### Networking Pro-Tips

1. **Dress the part:**

These professional networking events are formal. So make sure you look your best to leave a good impression.

2. **Be prepared:**

These networking events will introduce the companies attending, via booklet or online resource, before the events start. Learn as much as you can about a company of interest and impress them with you knowledge.

3. **Contact Information:**

After hitting it off with a professional attendee, ask for their contact information.

4. **Follow Up:**

These professionals lead very busy lives and are constantly meeting new students. Following up with them is an excellent way to leave an lasting impression.

5. **Talk about yourself:**

The foundation of all of these professional events is to open doors for those who impress and actively seek them. Don't be afraid to flaunt your talents!



## Chapter 6

# Wise Words Words of Encouragement

However, while you should always keep this goal in mind, you need to remember that the journey toward that degree is just as important, if not more so, than the degree itself. You will struggle, succeed, and grow beyond your expectations of yourself. McGill engineering builds innovative thinkers by pushing their students beyond their limits. The reality is, it is possible to put in minimal effort, barely pass your courses, and receive the same degree as everyone else. Your degree, without a doubt, will open doors. That being said, you will need to use your problem solving skills and work ethic, that you have spent years developing, to confidently walk through and into exciting new opportunities. The things that you have done at McGill and the hours that you have put in working hard will define that kind of engineer you want to be and ultimately become. So on behalf of MAME, the EUS, and McGill as a whole, we thank you for taking the time to read our survival guide and we hope you find it a useful tool.

*Sincerely, Kyle Weissman (VP Academic:2017-2018), Raphael Zonis (VP Academic:2015-2017),  
and Isabella Bozzo*