**INSTRUCTOR OFFICE HOURS AND CONTACT INFORMATION**

Matt Minnick, minnick@mcmaster.ca, BSB/B106, Extension: 24546, emergency cell: (905) 818-6818

**Term 1:**

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30</td>
<td>Office Hour!</td>
<td></td>
<td>Office Hour!</td>
<td>Office Hour!</td>
</tr>
<tr>
<td>09:30</td>
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<td></td>
<td>Office Hour!</td>
<td>Office Hour!</td>
</tr>
<tr>
<td>10:30</td>
<td>3O04 Prep</td>
<td>2P/3O Prep</td>
<td>Office Hour!</td>
<td>Office Hour!</td>
</tr>
<tr>
<td>11:30</td>
<td>3O04 BSB/B155</td>
<td>3O04 T ABB/166</td>
<td>3O04 BSB/B155</td>
<td>2P04 Prep</td>
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<tr>
<td>12:30</td>
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<td>2P04 BSB/137</td>
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<tr>
<td>13:30</td>
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<td>Office Hour!</td>
<td>Office Hour!</td>
<td>3O04 BSB/B155</td>
</tr>
<tr>
<td>14:30</td>
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<td>4A06 BSB/B101</td>
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</tr>
<tr>
<td>15:30</td>
<td>Office Hour!</td>
<td>4A06 BSB/B101</td>
<td>Office Hour!</td>
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</tr>
<tr>
<td>16:30</td>
<td>Office Hour!</td>
<td>4A06 BSB/B101</td>
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**Term 2:**

<table>
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<tr>
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<td>Office Hour!</td>
</tr>
<tr>
<td>14:30</td>
<td>Office Hour!</td>
<td>4A06 BSB/B101</td>
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<td>4A06 BSB/B101</td>
<td>Office Hour!</td>
<td>Office Hour!</td>
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</tbody>
</table>

Note: Office hour times are sometimes used by irregular meetings or course deliverables, so you can email me to make sure I'll be available and/or to reserve any “Office Hour!” time for you or your group (but feel free just drop by!)

**TEACHING ASSISTANTS**

Garik Patterson - pattergg@mcmaster.ca
Sameer Reodikar – reodikas@mcmaster.ca
Liam Flannigan – flannilg@mcmaster.ca
Taz Colangelo – colangtm@mcmaster.ca

**LAB TECHNICIAN**

Peter Jonasson, lab technician
BSB/B102
COURSE WEBSITE/ALTERNATE METHODS OF COMMUNICATION

Avenue to Learn (ATL) http://avenue.mcmaster.ca/ is the primary means of distributing information for 4A06. Set up ATL to email you with news postings for 4A06 so you get notified. For group/individual communications, you will be emailed directly.

INTENDED LEARNING OUTCOMES

By the end of 4A06 you will be able to:

1. Link your undergrad theoretical knowledge to the real world and apply it to CDIO (conceive, design, implement, and operate) a physical device through an engineering design process, including:
   a. Finding a real-world problem and conceiving of a solution to it, as well as the specifications required by that solution,
   b. Designing your solution through mathematical/physical modelling and incorporating engineering design principles,
   c. Implementing your design through iterations and rigorous testing, and
   d. Operating a device that solves the problem at the required specifications.

2. Work effectively in a team engineering work environment, including:
   a. Demonstrating commitment to your team’s objectives through punctuality, attendance, and positive engagement with the project,
   b. Giving constructive team member feedback,
   c. Using team member feedback about yourself to improve, and
   d. Fostering a healthy working environment with your team.

3. Communicate information about your inventions in a modern engineering world, including
   a. In technical reports which document your engineering design process (PSRs and technical reports),
   b. In technical seminars (live demos),
   c. In a tradeshow format (expo), and
   d. Via social media (creating a YouTube video presentations).

In order to achieve maximum success, you are encouraged to become a person who takes pride in knowing things and takes the initiative to learn things even when no one tells you to.

ASSessment

<table>
<thead>
<tr>
<th>Component</th>
<th>Each</th>
<th>#</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>Practice Pitch Presentations</td>
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<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>Project Status Reports</td>
<td>0.5%</td>
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<td>9%</td>
</tr>
<tr>
<td>Instructor Meetings</td>
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<td>8</td>
<td>4%</td>
</tr>
<tr>
<td>Shark Den</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Report</td>
<td>2%</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Video</td>
<td>1%</td>
<td>1</td>
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<tr>
<td>Presentation</td>
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<tr>
<td>DOS</td>
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<td>3.5%</td>
</tr>
<tr>
<td>Module Milestone</td>
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</tr>
<tr>
<td>Report</td>
<td>5%</td>
<td>1</td>
<td>5%</td>
</tr>
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</table>
Project Selection:
For your capstone project you can in principle select any project you like as long as:
1) The outcome is a physical device (not a piece of information),
2) The device has a purpose (it could be a device for a research lab here on campus, a device potentially anyone would want in their home, a tool helpful for a specific industry or company, etc., as long as it has a purpose),
3) It is sufficiently difficult that it requires you to do enough engineering work to complete it (consider past 4A06 projects as an example of the difficulty expected), and
4) It is interesting enough for you personally, has a good enough split of modules, aligns enough with your group members' intentions for the course, and has an outcome that you personally want to make happen enough that you'll all be motivated to put in the immense amount of work involved.
Projects must be approved by the course administration. For additional project selection tips check out the First Day section of ATL.

Instructor Update Meetings: Roughly once/month* formally meet with Dr. Minnick to update him on your project process.
Professionalism (10) (booked meeting more than 1 week in advance for meetings after the first one, all members present & on time, emailed notes in advance, presented challenges with positive attitude and plan to move forward, material and discussion made project status unambiguous and easy to understand)

*Note: The actual meeting schedule is 4 in September (3 for project selection help and 1 for finalizing the DOS), then another 2 in first term and 2 in second term for technical support, spaced out by at least 10 days. They don't actually need to be in different months! You're also welcome to have more meetings if you like!
**Practice Pitch Presentations:**

The Practice Pitch Presentations are presentations your group makes to the class, your TAs, your Dr. Minnick, and possibly to additional faculty and industry sponsors (who are donating money to fund your projects). You have exactly 5 minutes to explain specifically what you’re proposing to do and what it’s for (prior to Q&A). You don’t need to submit a written report or demonstrate a video for the practice pitches, but if you do we’ll mark them for you so you can better prepare for the Shark Den.

**Pitch Presentation Tips:**

1. Ensure that your laptop can connect quickly to the projector so it doesn't cut into your time and impact your impression.
2. Sharks will look up competing solutions for your problem on their phones so be prepared to explain why your project is superior to existing solutions (at least in certain cases you’re targeting).
3. Have your project significantly thought through; specifically, be ready to present a projected component list with suppliers and prices, algorithms you intend to use, etc. (You are not stuck to implementing it exactly the way that you pitch.)
4. Be specific with your target performance specs; How big is it? How heavy? How much will it cost? How fast does it achieve the task? With what precision? How long can it operate? etc.
5. Before your Shark Den pitch you should draft your DOS. Thinking the project objectives through to this detail will make your pitch much more effective.

**Deliverable(s):** Presentation Materials (i.e. PowerPoint, etc.) by end of class time.

**Shark Den (end of September):**

The Shark Den is a presentation to industry experts, research experts (other professors), and entrepreneurship experts (startup incubators). Prior to the Shark Den itself you'll submit the Shark Den Report & Video, which (if done well) will contribute major sections to your reports going forward.

**Deliverable(s):** Report and Video due on ATL by 2:30pm on the day of Shark Den. Presentation materials due before end of class time.

**Start of October: DOS (Device Objective Statement)**

Refine the specs you promised at the Shark Den based on feedback there. In addition to the deadline in the schedule, it also needs to be finalized ASAP to be on-track for PSRs.

In addition to the marks the DOS is worth directly, its sections will be marked for clarity again when you submit them as parts of the technical reports going forward, and not having one that's at least clear enough looking that it's satisfactory to the instructor would make you behind on the PSRs.

The DOS is ideally where you clarify your specific specs you’re targeting for the device as a solution to your problem. If your Shark Den Report is perfect, your DOS is likely already done. The point of rewriting it in that case is to officially commit to what you’re going to take on for the project.

The DOS should:

1. List the purpose of your final device (what is the problem you’re trying to solve, how do you quantify the benefit, and what is the advantage over current solutions?)
2. What your final device will do
3. The specs your final device will achieve when performing its task (e.g., reliability, speed, power consumption, weight, cost per unit, accuracy, etc.). Specs should be based on the specs required given the purpose of your
device. If it’s too difficult to achieve the specs to make your device useful, you should consider a different device/application.

4. The reduced specs your device will achieve for the Integration Demo.

5. The individual modules and their required performance specs for the Module Demo. These should be based on the specs each module will need to achieve for your device to achieve its final performance objective at Optimization.

6. In addition to the specs above (which list 100% for performance), give an impression of your idea for what 75%, 50%, and 25% performance looks like. This part especially should be completed in consultation with your TA.

An outline of a DOS will be available on ATL.

Updating the DOS: After the initial DOS, it can only be updated in a formal meeting with Dr. Minnick, and not within 1 week before a demo.

Individual Expression of Interest

As part of your first PSR, you must write a paragraph explaining:

1. Why you want to do this project,
2. What you’re particularly interested in about this project, and
3. What you promise your group members about what you’ll personally contribute to it and how you’ll interact with them.

Project Status Report (PSR)

A PSR is a report you make to your TA about the status of your project. The process is as follows:

1. Write an individual Weekly Letter (with a word processor) as per the expectations outlined in the document “4A06-PSRs” on Avenue
2. Complete any new Safety Reports (individually)
3. Complete an updated Project Timeline to reflect new project status (group submission folder)
4. Submit the letter, safety reports (if applicable), and updated group timeline to the ATL drop box by 14:30 on Tuesday.
5. The TA (and possibly the instructor) will review the PSR.
6. Meet with the TA and/or instructor, demonstrate your project’s status, and receive feedback.

A more detailed set of PSR expectations are available on Avenue, along with a sample example, under the title “4A06 – PSRs” along with a blank PSR template.

PSR Marks:

- Presentation & formatting (5)
  All sections present, no typos or formatting errors, figures labelled, project status justified.
- Project status (10)
  2 marks off for each week behind “on-track” your project is (based on your project timeline); to get credit you must demonstrate the progress you’re claiming
- Reflection (10)
  Genuine and honest reflection on self, team, and administration of progress and team work dynamic.

Note - Role of the TAs: Keep in mind that your TAs are primarily there for marking. To give you a chance to explore and develop your project yourself they generally won’t seek you out to provide technical support, but may be able to point you in the right direction if you seek them out for it.
End of November: Module Milestone
For the Module demo, you should have all separate parts of the device working and performing up to the level of their required final specs, but not integrated together yet.

Deliverable(s): Report due by 11:59pm the Friday before the demo. Video and presentation materials due by 2:30pm on the day of the demo.

End of January: Integration Milestone
The integration milestone is to demonstrate your device integrating its modules together to perform its final task, but not necessarily as well (i.e., reliably, accurately, quickly, etc.) as will be required for your final performance specs.

Deliverable(s): Report due by 11:59pm the Friday before the demo. Video and presentation materials due by 2:30pm on the day of the demo.

End of March: Optimization Milestone
The optimization milestone is to have your device performing its final task at the level of its promised performance specs.

Deliverable(s): Report due by 11:59pm the Friday before the demo. Video and presentation materials due by 2:30pm on the day of the demo.

Capstone Expo
As per Optimization Milestone but presentation is in the MUSC marketplace, 8 hours long, and for the public (not just for the course admin).

Deliverable(s): Report and Video due by 11:59pm the Tuesday before the Expo.

For more information on how you will be evaluated at each Milestone, please see the document “4A06 – Presentations, Videos, and Reports” on ATL.

EXTERNAL ACHIEVEMENTS BONUS
Using your 4A06 project for external achievements (e.g., entering your device in design competitions and competing in them, filing patents, entering pitch competitions like The Forge, creating and publishing technical reports / papers or tutorial videos from things you determined while doing your project, etc.) is strongly encouraged, and has the potential to earn bonus marks as multipliers on your final expo performance grade. The bonus marks available for these events depend on the level of achievement, so speak with Dr. Minnick to find out what you can expect for the achievement you're considering.

THE END-OF-TERM FAIR-WORK-FRACTION GRADE MULTIPLIER
Most course deliverables are group deliverables and marks received for them are group marks. However, after your group mark is calculated your TA will make a case for how much of a fair of a contribution to your project you made relative to a 100% fair contribution for your particular group (maximum 125%, minimum 0%). Your TA will back up this case with evidence from your PSRs and an [optional] final reflection and peer assessment you send the TA after the Expo. Your final mark in the course will be this fraction of a fair contribution multiplied by your final group mark.

COURSE SCHEDULE & DELIVERABLES
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic / Deliverable</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tue 3 Sep 2019</td>
<td>Intro Lecture, Email Dr. Minnick your group members by midnight (cc them, 1 email per group is OK)</td>
<td>BSB/B101</td>
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<td>Pitch Ideas to Instructor</td>
<td>BSB/B106</td>
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<td>Tue 10 Sep 2019</td>
<td>Practice Pitch #1</td>
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<td>Pitch Ideas to Instructor</td>
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<tr>
<td>Tue 17 Sep 2019</td>
<td>Practice Pitch #2</td>
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<td>Shark Den Prep with Instructor</td>
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<td>Tue 24 Sep 2019</td>
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<td>DOS Finalize with Instructor &amp; TA</td>
<td>BSB/B106</td>
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<tr>
<td>Tue 1 Oct 2019</td>
<td>PSR, receive toolkits. Safety Quiz, DOS, and Individual Expression of Interest due.</td>
<td>BSB/B101</td>
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<tr>
<td>Tue 8 Oct 2019</td>
<td>Mid-term recess</td>
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<tr>
<td>(2 Times in Term 1)</td>
<td>Additional Formal Instructor Tech Support Meetings</td>
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<tr>
<td>Tue 15 Oct 2019</td>
<td>PSR</td>
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<td>Tue 22 Oct 2019</td>
<td>PSR</td>
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<td>Tue 29 Oct 2019</td>
<td>PSR</td>
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<td>Tue 5 Nov 2019</td>
<td>PSR</td>
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<td>Tue 12 Nov 2019</td>
<td>PSR, Project Name, Logo, and Description for promotional material due</td>
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<tr>
<td>Fri 15 Nov 2019</td>
<td>Module Report Due</td>
<td>Online</td>
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<td>Tue 19 Nov 2019</td>
<td>Module Demo</td>
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<td>Tue 26 Nov 2019</td>
<td>PSR, Mid-Course Assessment</td>
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<td>Tue 3 Dec 2019</td>
<td>PSR, Mid-Course Assessment Take-up &amp; End-of-Term Pizza Party (if 80% completion of Mid-Course Assessment)</td>
<td>BSB/B101</td>
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<td>Fri 6 Dec 2019 - Mon 6 Jan 2020</td>
<td>First-term Exams and Recess</td>
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<td>Tue 7 Jan 2020</td>
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<td>(2 Times in Term 2)</td>
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<td>Tue 14 Jan 2020</td>
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<td>Fri 17 Jan 2020</td>
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<tr>
<td>Tue 21 Jan 2020</td>
<td>Integration Demo</td>
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### Materials and Fees

**Required Texts:**

- This Course Outline describes in detail the requirements for the course.
- Supporting technical information is available on Avenue to Learn.
- For refreshing their knowledge on the engineering design process, students could read chapters 3, 7, 11 and 12 of [http://itll.colorado.edu/courses_workshops/geen_1400/resources/textbook/](http://itll.colorado.edu/courses_workshops/geen_1400/resources/textbook/);

**Other Materials:**

Lab equipment and consumables (limited amount provided).

**Facilities**
In the 4A06 project room there are oscilloscopes, power supplies, signal generators, soldering irons, a wifi connection, and a number of other useful tools and facilities. People working on Eng Phys 4A06 have priority, and no one who isn’t in or responsible for 4A06 should be in the room without being accompanied by someone who is. See the Safety Quiz section for more details.

Each group will be signed out a toolkit with a number of useful hand tools. The toolkits need to be returned at the end of the course in working condition; you’re responsible for the costs of any tools that need replacing due to loss or perceived misuse, but regular wear and tear over the course of 4A06 is expected.

You're expected to clean up after yourself, and when in doubt to clean up for others as well to keep the room in presentable fashion. The room needs to be cleared of any personal property and returned to a clean state before the reimbursements will be issued at the end of the year.

If replaceable supplies (e.g., shrink wrap, soap, paper towels, wire, etc.) in the 4A06 room have run out or nearly run out, email your TA and/or Lab Tech to notify us to obtain more.

FUNDING
$650+/team is available to reimburse project costs (it will hopefully be more, depending on sponsor contributions). In March & April you'll receive some posts on ATL about how to submit the reimbursement form; for now, keep your receipts. In addition, the 4A06 room has a number of supplies available that will be of interest to everyone (cost sheet available on ATL). Talk to your TA for information.

STUDENT EXPECTATIONS
4A06 is a significant time commitment. In the past, on average, students have reported that they've personally spent 10 hours of real actual work on the project each week (i.e., about 300 hours total) outside of the group meeting times (i.e., presentations, weekly meeting with TAs, etc.). This is a huge amount of time, more than the unit count or classroom time would normally require. The most successful groups are usually those where:

1. group members all contributed equally (more or less), and
2. group members worked much more early in the course rather than at the end.

As members of a capstone course, students are expected to act with an appropriate level of professionalism, courtesy, and mutual respect. While we've made every effort to be clear with course rules in this outline they're ultimately laws more than rules, in that we'll ultimately do what's right in the event of a dispute even if it's technically not what's written.

Late Policy
All of the assessment due dates in EP 4A06 are detailed in the course outline and discussed during the first group meeting. It is an important and valuable skill to adhere to due dates. Due to both factors, EP 4A06 enacts a strict late policy in order to better prepare you for the professional world. The grade of any late submission will be multiplied by $0.99^n$, where $n$ is the number of minutes late the submission was.

ACCREDITATION LEARNING OUTCOMES
The Learning Outcomes defined in this section are measured for Accreditation purposes only, and will not be taken into consideration in determining a student’s actual grade in the course.
Outcomes

01.1 - Competence in Mathematics
01.2 - Competence in Natural Sciences
01.3 - Competence in Engineering Fundamentals
01.4 - Competence in Specialized Engineering Knowledge

02.1 - Demonstrates an ability to identify reasonable assumptions (including identification of uncertainties and imprecise information) that could or should be made before a solution path is proposed.

03.2 - Selects appropriate model and methods and identifies assumptions and constraints.

04.2 - Recognizes and follows engineering design principles including appropriate consideration of environmental, social and economic aspects as well as health and safety issues.
04.3 - Proposes solutions to open-ended problems.
04.5 - Includes appropriate health and safety considerations
04.6 - Determines and employs applicable standards and codes of practice.

05.3 - Creates, adapts, modifies and extends tools and techniques as appropriate to solve problems.

06.2 - Develops and implements processes and methodologies to manage the effectiveness of a team both in terms of the quality of the work produced by the team as well as the interpersonal relationships within the team.

07.3 - Constructs effective oral or written arguments as appropriate to the circumstances

09.2 - Addresses uncertainties in the prediction of interactions on society and the environment in a structured and transparent manner.

11.2 - Plans and effectively manages time, resources, and scope
12.1 - Critically evaluates and applies knowledge, methods and skills procured through self directed and self identified sources, including those that lie outside the nominal course curriculum.

ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at http://www.mcmaster.ca/academicintegrity.

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

ACADEMIC ACCOMMODATIONS
Students who require academic accommodation must contact Student accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contact by phone at 905.525.9140 ext. 28652 or e-mail at sas@mcmaster.ca.

For further information, consult McMaster University’s Policy for Academic Accommodation of Students with Disabilities.

**NOTIFICATION OF STUDENT ABSENCES AND SUBMISSION OF REQUEST FOR RELIEF FOR MISSED ACADEMIC WORK**

From [http://mcmaster.ca/msaf/](http://mcmaster.ca/msaf/) :

1. This is a self-reporting tool for Undergraduate Students to report absences DUE TO MINOR MEDICAL SITUATIONS that last up to 3 days and provides the ability to request accommodation for any missed academic work. Please note, this tool cannot be used during any final examination period.
2. You may submit a maximum of 1 Academic Work Missed request per term. It is YOUR responsibility to follow up with your Instructor immediately (NORMALLY WITHIN TWO WORKING DAYS) regarding the nature of the accommodation.
3. If you are absent for reasons other than medical reasons, for more than 3 days, or exceed 1 request per term you MUST visit your Associate Dean’s Office (Faculty Office). You may be required to provide supporting documentation.
4. This form must be submitted during the period of absence or the following day, and is only valid for academic work missed during this period of absence.
5. It is the prerogative of the instructor of the course to determine the appropriate relief for missed term work in his/her course.
6. You should expect to have academic commitments Monday through Saturday but not on Sunday or statutory holidays. If you require an accommodation to meet a religious obligation or to celebrate an important religious holiday, you may submit the Academic Accommodation for Religious, Indigenous and Spiritual Observances (RISO) Form to the Associate Dean’s Office. You can find all paperwork needed here: [http://www.eng.mcmaster.ca/current/documents.html](http://www.eng.mcmaster.ca/current/documents.html)

**4A06 MSAF Policies:**

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>If used by some group members</th>
<th>If used by all group members</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSR</td>
<td>Reweight to other PSRs</td>
<td>NA, individual deliverable</td>
</tr>
<tr>
<td>Report or video (except Expo)</td>
<td>No effect</td>
<td>Reweight to expo version</td>
</tr>
<tr>
<td>Expo report or video</td>
<td>No effect</td>
<td>No effect</td>
</tr>
<tr>
<td>Demo (except expo)</td>
<td>Remove absence-related professionalism penalty</td>
<td>Reweight to expo version</td>
</tr>
<tr>
<td>Expo demo</td>
<td>No effect</td>
<td>No effect</td>
</tr>
</tbody>
</table>

MSAFs used for some (but not all) group members for a demo will remove professionalism deductions for those group members not being absent. MSAFs used for all group members for a demo will move the weight of that demo to the expo. MSAFs used by individual group members for reports or videos have no effect. MSAFs used by all group members for reports or videos move the weight of those deliverables to the expo. MSAFs used for the expo deliverables (report, video, or live demo) have no effect.
NOTICE REGARDING POSSIBLE COURSE MODIFICATION

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

ON-LINE STATEMENT FOR COURSE REQUIRING ONLINE ACCESS OR WORK

In this course, we will be using Avenue to Learn. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.
REFERENCE TO RESEARCH ETHICS

The two principles underlying integrity in research in a university setting are these: a researcher must be honest in proposing, seeking support for, conducting, and reporting research; a researcher must respect the rights of others in these activities. Any departure from these principles will diminish the integrity of the research enterprise. This policy applies to all those conducting research at or under the aegis of McMaster University. It is incumbent upon all members of the university community to practice and to promote ethical behaviour. To see the Policy on Research Ethics at McMaster University, please go to http://www.mcmaster.ca/policy/faculty/Conduct/ResearchEthicsPolicy.pdf.

ATMOSPHERE

The Faculty of Engineering is concerned with ensuring an environment that is free of all adverse discrimination. If there is a problem that cannot be resolved by discussion among the persons concerned, individuals are reminded that they should contact their Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible.

MACHINE SHOP

We have permission to use, under supervision, a subset of the equipment in the Engineering and Science Machine Shop in JHE-115. The lead hand of the Engineering and Science Machine Shop, Mr. Clealand Berwick, will instruct you on using the subset of equipment in the shop and will provide advice. Mr Berwick will be at the second course meeting. You must obey the safety rules, some of which are: wear safety glasses at all times; tie back loose hair, clothing, and jewelry; wear proper footwear – no open shoes or sandals; no bare legs; the shop supervisors have final authority over access to tools and equipment; and, all injuries and near misses are to be reported immediately to the shop supervisor. Suggestion: take a CAD drawing with you to the shop; this will reduce the time it takes to get started (dimensions should be in imperial measurement – i.e. inches and feet). You must attend a machine shop orientation session in the machine shop before you are permitted to use the facilities of the machine shop. Mr Berwick can provide information on registration. Register in the machine shop for the orientation sessions. The machine shop hours are 8:30 am to 12:00 noon and 1:00 pm to 4:00 pm, with breaks at 10:00 am and 2:30 pm. You are not permitted to use power tools during the breaks.

4A06-SPECIFIC SAFETY INFORMATION

LSH: A Laboratory Safety Handbook (LSH) and other safety information and links can be accessed at www.mcmaster.ca/CEDTsafety/ Databases of safety information can be accessed from a McMaster computer at http://ccininfoweb.ccohs.ca At this site, SDS (material safety data sheets), Cheminfo, RTECS (registry of toxic effects of chemical substances), and bibliographic information are available.

Safety Quiz: Prior to accessing the 4A06 project room, you are required to watch the two safety videos and submit your safety quiz to your TA (must be completed individually). You can do this at any time, but will not be granted access to the room until you do, so an effective deadline is the end of September.

Access: You may work in the 4A06 project room 24-7, but you must never work in the project room alone. Note that your keycards will not work overnight or on days where the university is closed (stat holidays and the 10 or so days
between 25 Dec and 1 Jan, see Sessional Dates on the McMaster Website for details), and that propping the door open will sound an alarm that security will respond to, likely kicking everyone out.

**Food:** Eating and drinking in the 4A06 room is only permitted in the central area, and only away from hazardous materials. Remember to wash your hands before and after eating or touching your face!

**Safety Reports:** Safety reports must be filed for materials and processes prior to first use! This includes but is not restricted to: lamps, LEDs, lasers, high-speed mechanical components, epoxy, glue, metal, composites, plastics, lubricants, solder, and soldering. To file a safety report is to include the report with your weekly progress demonstration to your TA. The safety report is to be a précis (i.e., a concise summary written in your words) of the relevant health and safety information (i.e., what are the risks, and what precautions do you need to take). Appropriate safety precautions and adherence to all regulations, codes, and practices must occur at all times. The safety reports are required for all materials worked with. You must cite where you obtained the information. Ask your TA whether something warrants a safety report. If asking your TA is not possible, assume it does.

**Breakers:** Note that the electrical breakers for BSB/B101 are located in BSB/B102, so students that trip breakers should notify Peter immediately.

**Cameras:** The 4A06 room is subject to video surveillance, but the video feed is not watched until after the fact where necessary. In the event of an emergency, call security (88 or 905-522-4135) rather than waving your arms at the cameras.

### ADDITIONAL LAB SAFETY INFORMATION

#### INTRODUCTION

This document describes the application of McMaster’s Workplace Environmental Health and Safety Policy to the particular situation of undergraduate labs in the Engineering Physics Department. The policy is written for students, but applies to all people involved in the labs.

McMaster’s Workplace Environmental Health and Safety Policy is reviewed by the Central Joint Health and Safety Committee each year as well as signed by our University President.

The policy applies to students, visitors and volunteers.

The policy is available at [http://www.workingatmcmaster.ca/eohss/prevention/policy/](http://www.workingatmcmaster.ca/eohss/prevention/policy/)

#### CHAIN OF REPORTING FOR SAFETY TRAINING AND RESPONSIBILITY

You will be provided with a health and safety lecture at the beginning of the first lab. **You are responsible for ensuring that you understand this safety information.** The lab technician is responsible for ensuring that all equipment is in good working order. In the event of an emergency, notify your Teaching Assistant (TA) and the lab technician. They are responsible for calling medical aid if needed.

You must report any hazardous situation of concern to one level up according to the chart below. In case this person is not available, either contact the person delegated in their absence or the person positioned at the next level up. **You are expected to know this chain of reporting.**
DEPARTMENT CHAIR
Ray LaPierre (X 27764)

↑

INSTRUCTOR
Matt Minnick (X 24546, minnick@mcmaster.ca)

↑

LAB TECHNICIAN
Peter Jonasson (X 24935)

↑

TA

↑

STUDENT (YOU)

FIGURE 1. CHAIN OF COMMAND FOR HAZARD REPORTING.

PROPER LAB BEHAVIOUR

Everyone in the lab is responsible for their own safety as well as the safety of others.

GENERAL GUIDELINES

1. Conduct yourself in a responsible manner at all times in the laboratory.
2. Follow all written and verbal instructions carefully. If you do not understand a direction or part of a procedure, ASK YOUR TA or LAB TECHNICIAN BEFORE PROCEEDING WITH THE ACTIVITY.
3. Never work alone in the laboratory.
4. Perform only those experiments indicated by the lab manual or your TA/lab technician. Carefully follow all instructions, both written and oral. Unauthorized experiments are not allowed.
5. Do not eat food or drink beverages outside of the designated area in the laboratory. Do not use laboratory glassware as containers for food or beverages.
6. Be prepared for your work in the laboratory. Read all procedures thoroughly before entering the laboratory. Never fool around in the laboratory. Horseplay, practical jokes, and pranks are dangerous and prohibited.
7. Observe good housekeeping practices. Work areas should be kept clean and tidy at all times. Keep backpacks and overcoats out of traffic areas.
8. Be alert and proceed with caution at all times in the laboratory. Notify the TA or lab technician immediately of any unsafe conditions you observe.
9. Labels and equipment instructions must be read carefully. Set up and use the equipment as directed by your lab manual.
10. Experiments must be personally monitored at all times. Do not wander around the room, distract other students, startle other students or interfere with the laboratory experiments of others.
11. Dress properly during a laboratory activity. Long hair, dangling jewelry, and loose or baggy clothing are a hazard in the laboratory. Long hair must be tied back, and dangling jewelry and baggy clothing must be secured. Proper footwear must be worn, no flip flops, high heels, roller blades, etc..
12. Report any accident (spill, breakage, etc.) or injury (cut, burn, etc.) to the TA or lab technician immediately, no matter how trivial it seems.
13. **Cell phones and use of music headphones should be avoided** while working in the lab. They can be distracting and thereby increase the potential for an accident to occur.

14. Do not store food and drinks in refrigerators that are for lab supplies and vice versa


**PROCEDURE TO FOLLOW IN THE CASE OF AN ACCIDENT**

Know the locations and operating procedures of all safety equipment including: first aid kit(s), and fire extinguisher. Know where the fire alarm and the exits are located.

Know what to do if there is a fire drill during a laboratory period; turn off any electrical equipment in the event of a fire drill and leave the building.

In the case of an accident, notify your TA and the lab technician immediately. They will phone the emergency extension **88** in the event of an accident. Remain until medical aid arrives. If the TA or lab technician is unavailable, dial **88** yourself from a campus phone or 905-522-4135 (Security).