ENG PHYS 4A06
Design and Synthesis Project
Fall/Winter 2018/2019
Course Outline

Instructor Office Hours and Contact Information

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

Term 1:

	Monday	Tuesday	Wednesday	Thursday	Friday
09:30	Office Hour!	Office Hour!	Office Hour!	Office Hour!	2P BSB/244&9
10:30	Office Hour!	2P/3O Prep	Office Hour!	2P04 Prep	2P BSB/244&9
11:30	3O04 BSB/104	2P04 BSB/120	3O04 Prep	2P04 BSB/120	2P04 BSB/120
12:30	Office Hour!	3O04 BSB/B140	3O04 BSB/B140	Office Hour!	3O04 BSB/B140
13:30	Office Hour!	Check	Office Hour!	Office Hour!	Office Hour!
14:30	Check	4A06 BSB/B101	Check	Check	Check
15:30	Check	4A06 BSB/B101	Check	Check	Check
16:30	Check	4A06 BSB/B101	Check	Check	Check

Term 2:

	Monday	Tuesday	Wednesday	Thursday	Friday
09:30	Office Hour!	Office Hour!	Office Hour!	Office Hour!	Office Hour!
10:30	Office Hour!	Office Hour!	Office Hour!	Office Hour!	Office Hour!
11:30	Office Hour!	Office Hour!	Office Hour!	Office Hour!	Office Hour!
12:30	2E04 Prep	Office Hour!	2E04 Prep	2E04 Prep	Office Hour!
13:30	2E MDCL/1105	Check	2E MDCL/1105	2E MDCL/1105	Office Hour!
14:30	Check	4A06 BSB/B101	Check	Check	Check
15:30	Check	4A06 BSB/B101	Check	Check	Check
16:30	Check	4A06 BSB/B101	Check	Check	Check

Note: The "Check" times may *also* be office hours – please feel free to drop in if I'm here. However, these times are sometimes used by irregular meetings or course deliverables. You can email me to make sure I'll be available and/or to reserve any "Office Hour!" or "Check" time for you or your group. I will always be present during an "Office Hour!" time, emergencies notwithstanding.

Teaching Assistants

Kyle Ansilio
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Devan Wagner
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Michael Tucker
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Lab Technician

Peter Jonasson, lab technician
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Ext. 24935

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

Component	Each	#	Total
Practice Pitch Presentations	0.50%	2	1%
Project Status Reports	0.50%	17	8.5%
Instructor Meetings	0.50%	9	4.5%
Shark Den			
Report	2%	1	2%
Video	1%	1	1%
Presentation	2%	1	2%
DOS	3.5%	1	3.5%
Module Milestone			
Report	5%	1	5%
Video	2%	1	2%

Presentation / Live Demo	4%	1	4%
Integration Milestone			
Report	5.5%	1	5.5%
Video	2.5%	1	2.5%
Presentation / Live Demo	4.5%	1	4.5%
Optimization Milestone			
Report	6%	1	6%
Video	3%	1	3%
Presentation / Live Demo	5%	1	5%
Expo			
Report	14%	1	14%
Video	6%	1	6%
Presentation / Live Demo	20%	1	20%
External Achievement Bonus	0-3% Bonus		0-20%
Total	100%		100%
Modified by: Fraction of a Fair Contribution for your group you personally did averaged over the entire course as assessed by your TA & your Peer Evaluations	Multiplier		

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 3 in second term for technical support, spaced out by at least 10 days. They don't actually need to be in different months!

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.

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.

Shark Den Report

Explain and motivate the problem you're trying to solve with your device, and lay out the specs your required solution will need to have in order to solve this problem (these will lay the ground work for your project goals in your DOS).

1. Device Purpose
2. Device Performance & Testing Specs:
    a. What is the final device performance requirement?
    b. What is your module breakdown? What's the performance required for each module?
    c. What is your integration performance required?
    d. What is your work breakdown? Who's doing what?
    e. What is your plan for testing each of the performance metrics you've listed?
    f. What materials will be required and where will you buy them? What is the projected cost?
    g. Justify your constraints with background research

Shark Den Video

No more than 2 minutes which shows and motivates the problem you're going to solve and target specs for final device.

-Video is engaging and polished: (20)

-Video effectively motivates the problem and successfully lays out the solution specs (30)

Shark Den Presentation

Show your video and explain the purpose of your device live (no need to repeat information), then field Q & A. The video + presentation prior to the Q&A is on a strict 5-minute time limit.

-Professionalism (25)

Be punctual, and clear and focused in presentation

Polished slide show including video

-Problem Motivated and Solution Fit (75)

Problem clearly explained
Solution approach clearly explained
Clear that the solution proposed does solve the problem and why we need this solution to it in particular.

Start of October: DOS (Device Objective Statement)

Refine the specs you promised at the Shark Den based on feedback there. 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 your TA 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 is available on ATL.

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):
    a. Includes the date, TA name, your name, and your project name (see the template from your TA)
    b. [First week only]: Individual Expression of Interest
    c. Give an update on the state of the project,

   d. Identify new challenges encountered and address previous challenges: identify what you've tried / plan to try, and address how you've solved any solved challenges,
   e. Assigns each group member a number [out of 100%] representing what fraction of the useful work on the project that happened this week was done by them (total for all members must add to 100%), AND assigns the group a number [out of 100%] identifying how much of a normal "4A06 week's worth of work" this week represented in terms of progress for your group,
   f. Outlines what you're planning to do to be on schedule with the project for the next PSR (identify current challenges and what you're planning to do to overcome them), and
   g. Refers to any new safety reports you've submitted to your safety report drop box.
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 1430 on meeting days.
5. Wait for the TA to look over the PSR.
6. Meet with the TA to discuss & demonstrate your project's status and hear feedback.

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

- Challenge documentation (10)

Write up of challenges you had this week and engineering work you did to overcome them

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.

Module Report (140 Marks):

- Problem Specification (10) (i.e., your Shark Den Report, with sections updated in light of your DOS)
  - What is the final device for, how well should it work (what are the final performance specs)? What are the basic integration functionality specs (specs for integration demo)?
  - What is your module split up, what is the performance objective for each of the modules (how well does each module need to work in order for your final project to achieve its specs)?
  - In addition to listing the specs, as with the Shark Den Report, list how you plan to test the device to verify your specs; can refer to the testing section if completely discussed there.
- Mathematical Modelling & Design (50)
  - Show actual engineering work (applying science to solve real world problems) that you've done for the project
  - Code: discuss as relevant in the body of the document, and refer to full code in appendix. Provide flowcharts to identify [nontrivial] algorithms you've designed / incorporated.
  - Circuits: show diagrams (possibly in appendix) and waveforms as necessary using a circuit simulator.

  - Mechanical: show mechanical drawings for parts which needed to be machined, 3d cad model of 3d-printed parts, and provide structural analysis of any parts you've designed.
  - Note: Marks are only awarded for design if the design is relevant (it clearly should lead to performance for your device).
- Performance (25) and Testing (25)
  - Document the performance that you've achieved on each of the modules, and the testing procedure used to determine it.
  - Show us how you implemented your design and determined that it achieved the performance you expected.
  - Marks are assigned only if the performance is documented honestly and clearly employing good scientific measurement and engineering practice (i.e., correct use of error analysis)
  - Note: Marks are only awarded for performance if the performance was the result of design.
  - To get full marks you need to show tests relevant to your project achieving its goals, and demonstrate that your project does indeed achieve its goals. However, if your device does not achieve its goals you can still achieve testing (but not performance) marks if you determine exactly why your device doesn't work and outline a path forward (You can't achieve performance marks without testing documentation to back it up).
- EHS Code Considerations (5)
- SDS Précis (5)
- Presentation and Formatting (20)

Module Video:

Adds to the shark den video by not only motivating the final problem and specs your device will need to solve it, but also documenting current performance; For each module, lays out where it fits into main project, and shows its design & performance.

Video Marking Rubric:

-Video is engaging and polished (20)

-Video effectively motivates the problem and successfully lays out the solution specs (10)

-Video clearly demonstrates what the purpose is for each module (10)

-Video clearly shows each module performing (10)

Module Presentation:

Show your video and be prepared to demonstrate the performance of requested sections of your device live (TAs will select parts or all of your device for live demo).

-Professionalism (25)

Be punctual, and clear and focused in presentation

Polished slide show including video

-Project Performance (75)

Achieved required level of performance; if video convincingly shows performance of a section but that section fails to perform live then up to 50% of marks for that section's performance may still be awarded.

Note: If your project did not achieve your target specs for a demo then you can't get full marks on the PSRs until you do demonstrate that performance.

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.

Integration Report:

- *Updated contents of Module Report* (now refers to integrating components together as well, so necessarily involves more material in many sections) (140)
- Operating Instructions (10)
  - explain all the steps your user would need to take to operate your project. Random Eng Phys Profs will attempt to follow them as part of your assessment.

Integration Video

As per Module Video, but now also includes demonstrating the device performing its integration task.

-Video is engaging and polished: (20)

-Video effectively motivates the problem and successfully lays out the solution specs (10)

-Video clearly demonstrates the engineering that went into each module and integrating them together (10)

-Video shows the device performing its initial integration demo performance task (20)

Live presentation

As per Module Presentation, but now of the integration task as well.

-Professionalism (25)

Be punctual, and clear and focused in presentation

Polished slide show including video

-Project Performance (75)

Achieved required level of performance; if video convincingly shows performance of a section but that section fails to perform live then up to 50% of marks for that section's performance may still be awarded.

<u>End of March: Optimization Milestone</u>

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

Optimization Report:

- *Updated contents of Integration Report* (145)
- New section of report: Assembly Instructions (15)
  - Include all the necessary steps to recreate your project from purchasing to where someone's ready to follow the operating instructions.

Video now also shows final performance specs and path to the future

-Video is engaging and polished: (20)

-Video effectively motivates the problem and successfully lays out the solution specs (10)

-Video clearly demonstrates the engineering that went into each module and integrating them together, including any initial prototypes of the device i.e., integration (10)

-Video effectively shows off the features and performance of the final device (20)

Live Presentation is now for the final performance spec

<u>Final (Expo):</u>

Final Report:

- *Updated contents of Optimization Report*

As per optimization report but including any updates / corrections.

Final Video

As per optimization video but including any updates / corrections.

Capstone Expo (Presentation)

As per live presentation but in the MUSC marketplace, 8 hours long, and for the public (not just for the course admin).

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. 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

Date	Topic / Deliverable	Location
Tue 4 Sep 2018	**Intro Lecture,** Email Dr. Minnick your group members by midnight (cc them, 1 email per group is OK)	**BSB/B101**
	Pitch Ideas to Instructor	BSB/B106
Tue 11 Sep 2018	**Practice Pitch #1**	**BSB/B101**
	Pitch Ideas to Instructor	BSB/B106
Tue 18 Sep 2018	**Practice Pitch #2**	**BSB/B101**
	Shark Den Prep with Instructor	BSB/B106
Tue 25 Sep 2018	**Shark Den**	**BSB/B101**
	DOS Finalize with Instructor & TA	BSB/B106
Tue 2 Oct 2018	PSR, receive toolkits. Safety Quiz, DOS, Individual Expression of Interest.	**BSB/B101**
Tue 9 Oct 2018	*Mid-term recess*	
(3 Times in Term 1)	Additional Formal Instructor Tech Support Meetings	BSB/B106
Tue 16 Oct 2018	PSR	BSB/B101
Tue 23 Oct 2018	PSR	BSB/B101
Tue 30 Oct 2018	PSR	BSB/B101
Tue 6 Nov 2018	PSR	BSB/B101
Tue 13 Nov 2018	PSR, Project Name, Logo, and Description for promotional material due	BSB/B101

Fri 16 Nov 2018	**Module Report Due**	**Online**
Tue 20 Nov 2018	**Module Demo**	**BSB/B101**
Tue 27 Nov 2018	**PSR, Mid-Course Assessment**	**BSB/B101**
Tue 4 Dec 2018	**PSR, Mid-Course Assessment Take-up & End-of-Term Pizza Party (if 80% completion of Mid-Course Assessment)**	**BSB/B101**
Fri 7 Dec 2018 - Mon 7 Jan 2019	***First-term Exams and Recess***	
Tue 8 Jan 2018	PSR	BSB/B101
(3 Times in Term 2)	Additional Formal Instructor Tech Support Meetings	BSB/B106
Tue 15 Jan 2018	PSR	BSB/B101
Fri 18 Jan 2019	**Integration Demo Report Due**	**Online**
Tue 22 Jan 2019	**Integration Demo**	**BSB/B101**
Tue 29 Jan 2019	PSR	BSB/B101
Tue 5 Feb 2019	PSR	BSB/B101
Tue 12 Feb 2019	PSR	BSB/B101
Tue 19 Feb 2019	***Mid-term recess***	
Tue 26 Feb 2019	PSR	BSB/B101
Tue 5 Mar 2019	PSR	BSB/B101
Tue 12 Mar 2019	PSR	BSB/B101
Fri 15 Mar 2019	**Optimization Report Due**	**Online**
Mon 18 Mar 2019	**Super-secret pre-Optimization Demo Pizza Party (Note: Don't read this part)**	**BSB/B101**
Tue 19 Mar 2019	**Optimization Demo**	**BSB/B101**
Tue 26 Mar 2019	PSR	BSB/B101
Tue 2 Apr 2019	**Final Report and Video due (online, by 1430)**	BSB/B101
Fri 5 Apr 2019	**Capstone Expo**	**MUSC Marketplace**

Mon 8 Apr 2019	**Final Peer Assessment Due**	**Online**

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/ ;
- For engineering ethics: http://www.peo.on.ca/index.php?ci_id=1815&la_id=1 .

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.

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	Indicators
Recognized and followed an engineering design process.	4.1
Recognized and followed engineering design principles including economic design principles. (Social aspects and safety to the public are not covered in this course)	4.2
Proposed solutions to open-ended problems	4.3
Employed appropriate techniques for generation of creative ideas such as brainstorming and structured inventive thinking.	4.4
Included appropriate health and safety considerations	4.5
Integrated standards, codes of practice and legal requirements relevant to the activity.	4.6
Evaluated and selected appropriate modern tools.	5.1
Was able to use modern/state-of-the-art tools.	5.2
Creates, adapts, modifies and extends tools and techniques as appropriate to solve problems.	5.3
Was able to manage time and processes effectively, prioritizing competing demands to achieve personal and team goals and objectives.	6.1
Developed and implemented 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 inter-personal relationships within the team.	6.2
Worked in a group, took a leadership role as appropriate and relinquished the leadership role as appropriate.	6.3
Demonstrated an ability to respond to technical and nontechnical instructions and questions	7.1
Presented instructions and information clearly and concisely as appropriate to the audience	7.2
Constructed effective oral or written arguments as appropriate to the circumstances	7.3
Applied economic principles in decision making	11.1
Planned and effectively managed time, resources, and scope	11.2

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/ :

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

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://ccinfoweb.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/

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

Kyle Ansilio	**Devan Wagner**	**Michael Tucker**
ansilikf@mcmaster.ca	wagned@mcmaster.ca	tuckerm@mcmaster.ca

↑
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
15. For specific safety guidelines (e.g., electrical, chemical, etc.), consult your lab manual and McMaster's lab safety handbook: http://www.workingatmcmaster.ca/med/document/Lab-Safety-Handbook-1-36.pdf

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).