Course outline for 4th year thesis courses, 2013-2014
(Biochem 4B06, 4F09, 4R12, 4T15, HthSci 4R12)

Course Coordinators:

Dr. Felicia Vulcu  
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extension: 22838  
Office hours: Please email me to set up an appointment

Dr. Ishac Nazi  
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office location: HSC-4H30F  
extension: 20242  
Office hours: Please email me to set up an appointment

WELCOME:

The overall goal of these courses is to introduce you to the rich scientific culture in the McMaster University Department of Biochemistry and Biomedical Sciences. Here you will develop numerous laboratory skills while being exposed to cutting-edge innovative research. You may also attend a series of informal tutorials designed to develop your written and communication skills. 4B06 students are to design and present an oral presentation highlighting their work at the end of the year and 4F09/4R12/4T15 students are to prepare 2 oral presentations designed to highlight their work. All students are to submit a write-up of their work at the end of the year in the format of a thesis. Good luck and have fun😊

Biochem 4B06: An extended 6-unit senior research project in Biochemistry and Biomedical Sciences. Assessment is based on laboratory work (approximately 12 hours per week over two terms), an oral presentation and a final thesis report.

Biochem 4F09: A 9-unit senior thesis based on a major research project in Biochemistry and Biomedical Sciences. Assessment is based on laboratory work (an average of approximately 18 hours per week over two terms; depending on the distribution of the course load), two oral presentations and a final thesis report.

Biochem/HthSci 4R12: A 12-unit senior thesis based on a major research project in Biochemistry and Biomedical Sciences. Assessment is based on laboratory work (an average of approximately 24 hours per week over two terms; depending on the distribution of the course load), two oral presentations and a final thesis report.

Biochem 4T15: A 15-unit senior thesis based on a major research project in Biochemistry and Biomedical Sciences. Assessment is based on laboratory work (an average of approximately 30 hours per week over two terms; depending on the distribution of the course load), two oral presentations and a final thesis report.

Acknowledgement of Previous Work Related to the Project

For students who may have previously worked in the same laboratory in which they are completing the requirements for their thesis course, any work completed prior to the student’s registration in the thesis course must not be included as part of the student’s evaluation or final report without clearly identifying and acknowledging it.
Evaluation breakdown:

<table>
<thead>
<tr>
<th>Assessment tool</th>
<th>4B06</th>
<th>4F09/4R12/4T15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-year laboratory work (and overall research ability) evaluation</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Oral Presentation(s) - PowerPoint</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>1 presentation</td>
<td>2 presentations</td>
</tr>
<tr>
<td>Final-year laboratory work (and overall research ability) evaluation</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>Thesis</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

"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."

Schedule of Events and Due Dates:

<table>
<thead>
<tr>
<th>EVENT</th>
<th>DUE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial meeting form (4B06/4F09/4R12/4T15)</td>
<td>Thursday September 12th, 2013 - (submission by student)</td>
</tr>
<tr>
<td>Tutorials</td>
<td>TO BE ANNOUNCED</td>
</tr>
<tr>
<td>4F09/4R12/4T15 Oral PowerPoint presentation 1</td>
<td>Thursday December 5th, 2013</td>
</tr>
<tr>
<td>4B06/4F09/4R12/4T15 Oral PowerPoint presentation 2</td>
<td>Wednesday April 9th, 2014</td>
</tr>
<tr>
<td>Mid-year lab evaluation form (4B06/4F09/4R12/4T15)</td>
<td>Thursday November 28th, 2013 - (submission by thesis supervisor)</td>
</tr>
<tr>
<td>Final-year lab evaluation form (4B06/4F09/4R12/4T15)</td>
<td>Tuesday April 8th, 2014- (submission by thesis supervisor)</td>
</tr>
<tr>
<td>Thesis (4B06/4F09/4R12/4T15)</td>
<td>Wednesday April 2nd, 2014</td>
</tr>
</tbody>
</table>

UNLESS OTHERWISE SPECIFIED, all assignments and final write-ups (theses) are to be handed in during the designated due date no later than 4:00pm. Late penalty: 10% / day and will NOT be accepted after 5 days. An MSAF or Approval from the Associate Dean’s must be provided for any missed work (includes extensive lab work). Please go to the following website to obtain information on this process (http://www.mcmaster.ca/msaf/)
Description of Events:

1. **Initial meeting form** (Must be completed by September 12\textsuperscript{th}, 2013) – the student must arrange a meeting with his/her supervisor to discuss the research project, course requirements, work schedule and expectations of supervisor. The student and supervisor must agree on all these terms and then fill out the **Initial Meeting Form** provided which summarizes the main outcomes of the meeting. This should be handed in to the Administrative Assistant in the Undergraduate program Office (HSC 1H6) no later than September 12\textsuperscript{th}, 2013. Laboratory work should begin following this meeting.

2. **Safety training** (MUST be completed prior to the start of labs and returned to Meagan in HSC 1H6, biochemistryadvisor@mcmaster.ca) – Students must discuss their required safety training with their thesis supervisor prior to the start of labs. Each lab will have specific safety requirements depending on the research being conducted, however on top of this specific training EVERY students MUST complete the following safety training prior to the start of lab work: Technical WHMIS, Office WHMIS, Biosafety (specify level: BSL\textsubscript{___}), Fire safety, Asbestos Awareness, Ergonomics, Slips Trips and Falls, Chemical Handling and Spills, Violence and Harassment Program, AODA training, Emergency Code Awareness training (All FHS personnel working in a hospital environment). Site specific training should also be conducted and documented by each lab safety representative. Students need to document their training and complete the safety training documentation form attached to this outline before the start of lab work. Students can discuss this with their lab safety representative, their thesis supervisor or they can contact the Biochemistry Department safety representative, Jodi Biro (HSC-4N59, biroj@mcmaster.ca). It is the responsibility of the **thesis supervisor** to ensure all thesis students have received their safety training and are conducting their experiments in a safe manner. It is also the responsibility of the supervisor to ensure their thesis students are being supervised during their time in the lab. If you require more information on this subject please ask your thesis supervisor or contact Jodi Biro in the Biochemistry Department (HSC 4N59) or the FHS safety office (HSC 1J11).

3. **Tutorials** - please note that the tutorial hours are not included in the number of hours each student must spend in the lab and tutorials are NOT mandatory! Tutorial dates and times will be announced shortly. Tutorials are designed to guide you through the thesis write-up and the presentations.

4. **Presentation dates:** December 5\textsuperscript{th}, 2013 (4F09/4R12/4T15 students only) and April 9\textsuperscript{th}, 2014 (4B06/4F09/4R12/4T15 students) - Presentations are worth 25\% of the final mark. First presentation is a closed forum. Students will be divided into sections and will present in front of a panel of committee members (researchers) and their section peers. Please note that students MUST attend ALL presentations in their section. The second presentation is an open forum. Students will be divided into sections and will present in front of a panel of committee members, their section peers and anyone who wishes to attend. Please note that students MUST attend ALL presentations in their section. Please read the “**Oral Presentation Guidelines**” for details. When not presenting, each student will review other students’ presentations and provide constructive feedback on the form provided. Students will upload their completed reviews as 1 word (or pdf) file in the A2L dropbox folder. Deadline for submission is December 6\textsuperscript{th}.

Presentation feedback form (paper copies will be provided for you during the presentation or you can type up the comments on your laptop during the presentation):

- Write down 2 questions pertaining to the research presented
- Comment on overall flow and content delivery of the presentation
- Identify at least 2 good aspects and 2 weak aspects of the presentation and give suggestions on how to improve the weak aspects.
5. **Submission of final thesis: April 2nd (2014)** - The thesis is worth 25% of the final mark. Submit 1 ELECTRONIC copy on Avenue2Learn (pdf format, 1 document) and 1 paper copy directly to your thesis supervisor. Late submissions will be penalized with a deduction of 10% per day from the final mark of the thesis.

6. **Mid-Year laboratory work evaluation: November 28th, 2013** - Near the end of term 1 the supervisor will fill out and electronically submit a final mid-year laboratory work evaluation form to Felicia Vulcu (electronic submission only: vulcuf@mcmaster.ca). This submission is done by the thesis supervisor. The thesis supervisor needs to submit one copy of the completed form to the thesis student, along with a meeting to discuss the progress to date.

7. **Final-Year laboratory work evaluation: April 8th, 2014** - At the end of the term the supervisor will fill out and electronically submit a final final-year laboratory work evaluation form to Felicia Vulcu (electronic submission only: vulcuf@mcmaster.ca). This submission is done by the thesis supervisor. The thesis supervisor needs to submit one copy of the completed form to the thesis student, along with a meeting to discuss the progress to date.

Supervisors will evaluate their students based on criteria such as:

1. **Laboratory Work**
   - Ability to plan and execute experiments in an efficient and organized way
   - Skill in laboratory techniques
   - Ability to interpret data; not to overlook any conclusions nor to draw unfounded conclusions

2. **Responsibility and commitment to project**
   - Demonstration of originality and independence of thought

3. **Understanding of the research problem and how it fits in with existing knowledge and future studies**

Supervisors are requested to provide justification for the grade assigned with specific comments and examples. **Thesis supervisor must meet with the student to discuss this evaluations (please provide the student with a copy of each evaluation form as feedback).**

8. **Lab notebook guidelines** – These guidelines are suggestions to help you setup your notebook. It is STRONGLY RECOMMENDED that you discuss with your thesis supervisor the specifics of maintaining a laboratory notebook.

A notebook is an essential tool to help organize your laboratory research. Number each page of the notebook, date and record each experiment, including the experimental procedure, results and analysis with calculations. The content of the notebook should be easily readable and should contain enough information so that another undergraduate student could repeat the experiment with no prior knowledge. Care should be taken to ensure the notebook is very organized and contains an index for ease of navigation. Make sure to include all details of day-to-day experiments including a purpose for the experiment, any mistakes made throughout the experiment and the conclusions. Include all discussions and thoughts on the experimental goals (this includes email communications between your supervisor/collaborator(s)). This notebook is an integral part of your supervisor’s research and must be left with the supervisor at the conclusion of the project.

To assist with your review of the literature, students will find PubMed to be an excellent research tool. PubMed is a service of the National Library of Medicine which searches the MEDLINE database covering the fields of medicine, nursing, dentistry, veterinary medicine, the health care system, and the preclinical sciences. PubMed includes links to many sites providing full text articles online and other related resources. PubMed: [http://www.ncbi.nlm.nih.gov/entrez/query.fcgi](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi)

9. **Completion of Lab Work** – It is recommended that students enrolled in 4B06, 4F09 and 4R12, 4T15 should aim to have their laboratory experiments completed by the end of Reading Week in February (18th – 22nd, 2013), to
allow sufficient time for data analysis, preparing your presentation and writing your thesis. Please discuss the date for completion of lab work with your thesis supervisor.

Please check the Biochemistry 4B06/4F09/4R12 folders on A2L for important information and day-to-day updates and all relevant course material.

10. **Relevant Material/ Suggested book:** Course outline/From Research to Manuscript: A Guide to Scientific Writing by Michael Jay Kats. The book is currently available as an (e-resource) at Thode Library. Please focus on Chapters 2 (The Scientific Paper) and 3 (Tools and Techniques).

11. **Academic Dishonesty**—My assumption is that every student attending this course is doing so to genuinely explore the world of Biochemistry and Biomedical Sciences. Any student that would like to ignore my assumption should visit the Academic Integrity Policy at McMaster University for information on academic dishonesty ([http://www.mcmaster.ca/academicintegrity/](http://www.mcmaster.ca/academicintegrity/)).
Suggested Thesis guidelines (4B06/ 4F09/ 4R12/ 4T15)

Introduction:

McMaster University Department of Biochemistry and Biomedical Sciences is dedicated to showcasing the monumental achievements of the undergraduate project students currently undergoing research projects in the department.

Below is an overall description of the submission guidelines which could be followed by each student. Aside from the page length and overall formatting, the remainders of these guidelines are strong suggestions to aid in constructing the overall flow of the thesis (the due date/time is NOT a suggestion: it is a requirement). Students should consult with their thesis supervisors about the specifics of their thesis construction.

All thesis submissions must be handed in electronically (on A2L) by the specified due date (April 2\textsuperscript{nd}, 2014) \textbf{no LATER than 4:00pm}. Submit 1 electronic copy on Avenue2Learn (pdf format, 1 document) and 1 paper copy directly to your thesis supervisor. You can embed the figures throughout the thesis if you wish and if your thesis supervisor prefers this type of formatting.

Formatting Guidelines:

- Manuscript should be formatted for 8.5 x 11 inch paper.
- Text should be formatted as Times New Roman font size 12 with double spacing throughout.
- The entire thesis SHOULD NOT EXCEED 20-25 pages (MAXIMUM LENGTH!!), double-spaced with 1-inch margins all around. \textbf{This includes all sections from Abstract to Discussion (see below) but excludes References to Supplemental Data.} The Materials and Methods section can be single spaced.
- All pages should be numbered (bottom, centre, (1, 2, etc.))
- The outline of the manuscript should follow this order:
  - Title, Author(s) (your name first, your supervisor’s name last and name of all other contributing members in between) and name of institution date of submission, name of course

\textbf{Abstract}
\textbf{Introduction}
\textbf{Materials and Methods}
\textbf{Results (you can combine the results and discussion sections if you wish)}
\textbf{Discussion}
References
Abbreviations
Figure Captions
Tables
Figures
Supplemental data (If applicable)

\textbf{Title:} should be short and straight to the point (no more than 2 printed lines)

\textbf{Abstract:} should be clear and concise in its summary of your main finding(s). This section should not exceed 300 words.

\textbf{Introduction:} should clearly place your findings in the context of the field as a whole. This section should not be used as a long summary of the field. Diagrams explaining your points are highly recommended (they must be original creations NOT copied from other sources!)

\textbf{Materials and Methods:} should be concise and easy to follow so that your experiments could be repeated by another student. The experiments should be clearly laid out and must spell out all buffers used (including concentrations), all
equipment used, centrifuge rotors used, speeds of centrifuges, method of lysing cells, etc. PLEASE FOLLOW THE SAME GUIDELINES YOU USED IN YOUR OTHER LAB COURSES (2L06, 3P03). When constructing clones ALL primers used must be written out. REFERENCE!!!

**Results**: This section should describe the data presented in your figures. Care must be taken not to over-analyze or discuss the data in this section.

**Discussion**: This section is designed entirely for interpreting the data. You can include future experiments that need to be done, other controls that should be performed and even your opinion on what the data might mean to the field as a whole. You can even use a diagram to make your point clear Care should be taken not to over-analyze your data. You should present your ideas in a clear, thought-out manner.

**References**: should be cited throughout the text by number, example (1). The references should follow a format that is used by your lab (keep formatting consistent).

**Abbreviations**: All abbreviations used in the text should be written out in long form the first time they are introduced, example polymerase chain reaction (PCR). This section should contain all abbreviations used along with their long form.

**Tables**: Should contain a title and a short description of the table.

**Figures/ Figure Captions**: should have titles and figure legends describing the experiment in sufficient detail to allow readers to understand the figure in the absence of additional text. The figure legend should include scale bar information for images and details of data points. All figures should be high quality.

**Supplemental Data**: should follow the guidelines described above but should be included at the end of the manuscript. If new techniques are involved they must be described in a short supplemental materials and methods section. This should be followed by supplemental figure captions and the supplemental figures.

Additional information on writing styles can be found at the following website:

http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWtoc.html
Oral Presentation Guidelines

NOTE: You must attend ALL presentations for your section.

FIRST ORAL PRESENTATION – December 5th, 2013 (4F09/4R12/4T15 students)

The first oral presentation should emphasize the:
- Objective of the project
- Background information necessary to understand its relevance and importance
- Research plans
- Methods adopted
- Research work accomplished thus far and further planned

The main goal of the first presentation is to convey your full understanding of the project objective(s) and how it fits in with the field as a whole. The format can be thought of as a research proposal with some preliminary data. This means that emphasis should be placed on the overall aspects of the research plan, the experimental techniques that will be utilized to test your hypothesis (you should know the theory behind these research techniques and possible advantages/disadvantages of each technique) and how they will be implemented in the context of your research objective(s). You should also include data to-date that you have generated using the techniques described and summarize the results obtained thus far and what they represent in the context of your project goals.

All presentations must be created on PowerPoint. A laptop computer and projector will be available for your presentation.

Students will be required to download a copy of their presentation to a private folder in the 4F09/4R12 A2L folder before 9 am on the day before their presentation (the day before the presentation date is December 4th). Late penalty: 10%/hour. Please ensure that you upload only 1 version of your presentation as additional versions will not be accepted throughout the day. Also, please bring a copy of your presentation with you on a USB drive in case the A2L version of your presentation does not work.

Each presentation will last 15 minutes with 5-10 minutes of questions and discussion. Presenters cannot use notes during their presentations. Any work done during summer months or prior to the beginning of the project should be clearly identified and acknowledged. Please make sure that you clearly identify on your slide if the data you are showing was generated by another person in your lab.

Students will be divided up into a presentation session. These sessions will be posted on A2L. The first oral presentation is a closed forum. Only the course coordinators, the 4F09/4R12/4T15 thesis supervisors and the 4F09/4R12/4T15 students presenting will be in attendance. Please note; each student MUST attend ALL other presentations in their session. Each student will be evaluated by a committee consisting of the attending supervisors.

Students will be evaluated based on their:
1. Understanding of the background
2. Understanding the problem and its significance
3. Knowledge of experimental approach
4. Experimental progress made
5. Ability to interpret/ analyze results
6. Ability to answer questions
7. Overall presentation (includes flow of presentation/ clarity of slides/ quality of slides/ references/ grammar and technical language)

The members of the committee will be asked to fill out and submit an ‘Evaluation of Oral Presentation’ form to Felicia Vulcu (or the Undergraduate Administrative Assistant, HSC-1H6) at the conclusion of the oral presentations.
SECOND ORAL PRESENTATION – April 9th, 2014 (4B06/ 4F09/ 4R12/4T15 students)

In the second oral presentation students will present the final results of their experiments. This presentation should be a more typical research presentation summarizing your research project. Your focus should be in presenting the data generated and describing how your results fit in with your research plan and the field as a whole.

Please note; this presentation is an open forum. All presentations are open for anyone to attend, space permitting.

Again, students will be required to download a copy of their presentation to a private folder in the 4F09/4R12 A2L folder before 9 am on the day before their presentation (the day before the presentation date is April 8th). Late penalty: 10%/hour. Please ensure that you upload only 1 version of your presentation as additional versions will not be accepted throughout the day. Also, please bring a copy of your presentation with you on a USB drive in case the A2L version of your presentation does not work.

Each presentation will last 15 min with 5-10 minutes of questions and discussion. Any work done during summer months or prior to the beginning of the project should be clearly identified and acknowledged.

This is an open attendance so anyone can come to see your presentation given room availability. If you have friends and family attending, please ask them to wait until the break before leaving the presentation room so as not to disturb the presenters. Please note; each student MUST attend ALL other presentations in their session. Each student will be evaluated by a committee consisting of the attending supervisors. The members of the committee will be asked to fill out and submit an ‘Evaluation of Oral Presentation’ form to the course coordinator at the conclusion of the oral presentations. Students will be evaluated based on similar criteria as their first presentation. Students and supervisors will be notified of the exact time and location of the presentations. Please check the A2L folder weekly for updates.

Students will be evaluated based on their:

1. Understanding the background
2. Understanding the problem and its significance
3. Knowledge of experimental approach
4. Experimental progress made
5. Ability to interpret/ analyze results
6. Ability to answer questions
7. Overall presentation (includes flow of presentation/ clarity of slides/ quality of slides/ references/ grammar and technical language)
FORMS and MARKING SCHEMES

☑ SAFETY TRAINING DOCUMENTATION FORM (4B06/4F09/ 4R12/4T15)
☑ INITIAL MEETING FORM (4B06/4F09/ 4R12/4T15)
☑ MID-YEAR LABORATORY WORK (AND OVERALL RESEARCH ABILITY) EVALUATION FORM (4B06/4F09/ 4R12/4T15)
☑ FINAL-YEAR LABORATORY WORK (AND OVERALL RESEARCH ABILITY) EVALUATION FORM (4B06/4F09/ 4R12/4T15)
☑ EVALUATION OF THESIS MARKING SCHEME (4B06/4F09/ 4R12/4T15)
☑ EVALUATION OF 1ST ORAL PRESENTATION MARKING SCHEME (4F09/4R12/4T15)
☑ EVALUATION OF 2ND ORAL PRESENTATION MARKING SCHEME (4B06/4F09/ 4R12/4T15)
Safety training documentation form: Using the form provided below, please fill out the “date completed” for the following required health and safety training courses. **Please include any other safety training courses required for your specific lab space.** You must have these dates initialed by your designated lab safety representative. This form must be submitted to Meagan (HSC-1H6, biochemistryadvisor@mcmaster.ca) before the start of labs (latest due date: September 13, 2013). You need to complete this form by the specified date (all training specified below must be up-to-date, any other lab-specific training must be completed and documented) in order to continue in the thesis course.

Student Name: ____________________  
Course ID: ________  
Thesis Supervisor: ____________________  
Date: ________

<table>
<thead>
<tr>
<th>Course Name (please note, we only require the most updated date)</th>
<th>Date Completed</th>
<th>Initials (by Lab Safety Representative – please initial each training date to confirm that the student has received updated lab specific safety training requirements. Please add any other safety training courses required by your lab)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical WHMIS</td>
<td></td>
<td></td>
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<tr>
<td>Office WHMIS</td>
<td></td>
<td></td>
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<tr>
<td>Biosafety (specify level: BSL__)</td>
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<tr>
<td>Fire safety</td>
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<tr>
<td>Asbestos Awareness</td>
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<td>Ergonomics</td>
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<td>Slips Trips and Falls</td>
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<td>Chemical Handling and Spills</td>
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<td>Violence and Harassment Program</td>
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<td>AODA</td>
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<tr>
<td>Emergency Code Awareness training (All FHS personnel working in a hospital environment)</td>
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**Training Type**  
Signature of lab safety representative to verify student has acquired training and a record of their training is available in the lab safety binder

| site-specific training                                       | |                                                                 |
| Working alone policy (if applicable)                        | |                                                                 |

**Name of Lab Safety Representative:** __________________________
INITIAL MEETING FORM

(4B06/4F09/4R12/4T15)

Please take the time with your student to summarize the outcome of the following discussion topics. Please hand in this sheet to the Undergraduate Assistant (Meagan) in HSC 1H6 (Mon-Fri 11am-12:30pm). The form is due by Sept 12th, 2013.

1. **Research Project** (a quick summary of the main goal(s) of the project):

2. **Course Requirements** (clearly write out all the course components that need to be achieved by the student and the supervisor):

3. **Work Schedule** (a statement showing that the student understands the main concept of the research project and feels confident that the time allotted is sufficient to achieve the goal):

4. **Expectations of supervisor**:

   **Expectations of student**:

5. **Summary of summer work** (applicable only if student has previously worked in the same laboratory, please attach an additional 1-page summary of summer research completed):

Student Name _________________________  Supervisor Name _____________________________

Signature of student ____________________

Signature of supervisor (I hereby take full responsibility for the safety of my thesis student during their time in my lab) ________________

Date Completed: ________________________________
MID-YEAR LABORATORY WORK (AND OVERALL RESEARCH ABILITY) EVALUATION
(TO BE COMPLETED BY THE THESIS SUPERVISOR)

(4B06/4F09/4R12/4T15)

Please complete electronically and email to Felicia Vulcu (vulcuf@mcmaster.ca) NO LATER than Nov 28th, 2013

Student Name and Thesis Course Code (example 4B06): ________________________________

Supervisor Name: ____________________________________________________________

Date Completed: ____________________________

<table>
<thead>
<tr>
<th>PLEASE COMMENT IN THE SPACES PROVIDED BELOW</th>
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</thead>
<tbody>
<tr>
<td>1. Understanding the problem.</td>
</tr>
<tr>
<td>2. Familiarity with relevant literature</td>
</tr>
<tr>
<td>3. Initiative</td>
</tr>
<tr>
<td>4. Work habits</td>
</tr>
<tr>
<td>5. Ability at research</td>
</tr>
<tr>
<td>6. Work completed and its significance</td>
</tr>
<tr>
<td>7. Data analysis interpretation</td>
</tr>
<tr>
<td>8. Industriousness</td>
</tr>
<tr>
<td>9. Experimental judgment</td>
</tr>
</tbody>
</table>

Overall ability (numerical score out of 100)
Please complete electronically and email to Felicia Vulcu (vulcu@mcmaster.ca) NO LATER than Apr 8th, 2014

Student Name/Thesis Course Code (example 4B06): ________________________________

Supervisor Name: ________________________________

Date Completed: ________________________________

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</tr>
</tbody>
</table>

Overall ability (numerical score out of 100)
EVALUATION OF THESIS

(4B06/4F09/4R12/4T15)

Please complete electronically and email to Felicia Vulcu (vulcuf@mcmaster.ca) NO LATER than April 9th, 2014

The thesis should be evaluated based on the following criteria:

1. Understanding of the problem and relevant background information.
2. Results obtained and their interpretation/analysis.
3. In cases where significant problems were encountered, how they were approached and resolved.
4. Clarity of thesis presentation (flow of ideas, smooth transition between concepts, placement of main gap studied within the field of study, citation style and usage, etc).

The thesis is worth 25 marks. Based on the above criteria, please assign a mark out of 25 giving appropriate justification.

Student Name and Thesis Course Code (example 4B06):__________________________________________________________

Supervisor Name: __________________________________________________________

Date Completed: __________________________

Final Mark (/25):____________________________

Comments:
EVALUATION OF 1ST ORAL PRESENTATION (Dec 5th, 2013)

(4F09/4R12/4T15)

NOTE: Please note on the sheet if a student is late or not present. If you need any help please contact Felicia at x22838 or Meagan at x22495. All students MUST ATTEND ALL presentations in their section!

Date _____________________________________________________

Student Name: __________________________________________________________

Committee Member: ____________________

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>Maximum Mark</th>
<th>Mark</th>
<th>COMMENTS!!!! (We would really appreciate constructive criticism on these points. We type up the comments and email them to the students so they can improve from this experience. Thank you)</th>
</tr>
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<tbody>
<tr>
<td>1. Understanding the background</td>
<td>10*</td>
<td></td>
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<tr>
<td>2. Understanding the problem and its significance</td>
<td>10*</td>
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<tr>
<td>3. Knowledge of experimental approach</td>
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<tr>
<td>4. Experimental progress made (if progress made is inadequate, then the main reasons for it)</td>
<td>5**</td>
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<tr>
<td>5. Ability to interpret/ analyze results</td>
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<tr>
<td>7. Overall presentation (includes flow of presentation/ clarity of slides/ quality of slides/ references/ grammar and technical language)</td>
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</tbody>
</table>

TOTAL 50

*1-2 = unsatisfactory, 3-4 = marginal, 5-6=satisfactory, 7-8 = good, 9-10 = excellent
**1 = unsatisfactory, 2 = marginal, 3=satisfactory, 4 = good, 5 = excellent. A mark of 0 can be given if student does not meet the criteria specified.
EVALUATION OF 2\textsuperscript{nd} ORAL PRESENTATION (Apr 9\textsuperscript{th}, 2014)

(4B06/4F09/4R12/4T15)

NOTE: Please note on the sheet if a student is late or not present. If you need any help please contact Felicia at x22838 or Meagan at x22495. All students MUST ATTEND ALL presentations in their section!

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