Course Requirements and Timetable for

Biochemistry 4B06/4F09/4R12

Course Instructor:

Felicia Vulcu – Biochemistry 4B06/4F09/4R12

e-mail: vulcuf@mcmaster.ca, office location: HSC-1H6, extension: 22341.

- UNLESS OTHERWISE SPECIFIED, all assignments and final write-ups (thesis) are to be handed in during the designated due date no later than 4:00pm in the Biochemistry drop boxes (black cabinet by HSC-4H39) Late penalty: 20% / day and will NOT be accepted after 2 days

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

Welcome to Biochemistry 4B06/4F09/4R12. The overall goal of this course 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 will also attend a series of tutorials designed to develop your written and communication skills. 4B06 students are to design and present a poster highlighting their work at the end of the year and 4F09/4R12 students are to prepare 2 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 scientific journal article. Good luck and have fun!

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

Biochem 4F09: A 9-unit senior thesis based on a major research project in Biochemistry. 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 4R12: A 12-unit senior thesis based on a major research project in Biochemistry. 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.

Teaching Assistant:

Shannon Falconer

Evaluation breakdown:

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<tr>
<th>Assessment tool</th>
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<th>Biochemistry 4F09</th>
<th>Biochemistry 4R12</th>
<th>% of final mark</th>
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<tr>
<td>Mid-year laboratory work (and overall research ability) evaluation</td>
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<tr>
<td>Poster Presentation</td>
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<td>PowerPoint Presentations</td>
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"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."


**Suggested book**: 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).

**Schedule of Events**:

**Initial meeting FORM (Must be completed by September 13, 2010)** – the student should 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 Biochemistry drop boxes (black cabinet besides HSC-4H39) no later than September 13, 2010. Laboratory work should begin following this meeting.

Tutorial - please note that the tutorial hours are not included in the number of hours each student must spend in the lab. 3 tutorials/ year designed to assist you through the poster/Powder Presentation presentations. Tutorial times will be posted on A2L.

A Teaching Assistant will also be available throughout the year for guidance and advice regarding presentations and thesis.

**4F09/4R12 presentation dates November 15-22(2010), March 21-28 (2011)**. First presentation is worth 10%, the second presentation is worth 15%. Please read the “Oral Presentation Guidelines for Biochemistry 4F09/4R12” for details.

**4B06 poster presentation dates march 29 (2011), worth 25% of the mark**. Please read the “Poster Presentation Requirements for Biochemistry 4B06” for details.

**Submission of final thesis – April 5, 2011 (worth 25%)**. Submit one copy of your final journal article directly to your supervisor and submit 2 copies to Mizan Graham in HSC 4N45. You will also submit 1 electronic copy to Mizan Graham. Late submissions will be penalized with a deduction of 2% per day from the final mark. Do NOT bind your thesis!

**Mid-Year laboratory work evaluation (and overall research ability) (20%) – November 29, 2010**. Near the end of term I the supervisor will fill out and submit a final “Mid-Year laboratory work (and overall research ability) evaluation” form (attached) to Mizan Graham in HSC 4N45. Supervisors will evaluate their students based on:

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. **Students will be provided with a copy of this evaluation form as feedback.**

**Final laboratory work evaluation (and overall research ability) – April 5, 2011 (worth 30%)**. At the end of the term the supervisor will fill out and submit a final “Evaluation of Laboratory Performance” form (attached) to Mary Margaret Strong. Supervisors will evaluate their students based on:

4. 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

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

6. 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.

**Lab notebook guidelines** - 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. Please check the ELM course folder and read Chapters 2 and 3 of the “From Research to Manuscript: A Guide to Scientific Writing” for guidelines on how to keep a lab notebook.

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. MEDLINE contains bibliographic citations and author abstracts from more than 4,600 biomedical journals published around the world dating back to 1966. PubMed includes links to many sites providing full text articles online and other related resources.


Please follow this link to visit the animated tutorials on how to use PubMed: [http://www.nlm.nih.gov/bsd/disted/pubmed.html#qt](http://www.nlm.nih.gov/bsd/disted/pubmed.html#qt)

Remember when searching databases, that your choice of key words is important in getting the best search results possible.

The majority of the journals related to research in Biochemistry are located in the Health Sciences Library. Many of these journals can be accessed online through PubMed and also through the library’s subscription to online resources [http://library.mcmaster.ca/search/](http://library.mcmaster.ca/search/)

**Completion of Lab Work** - Students enrolled in 4B06, 4F09 and 4R12 should aim to have their laboratory experiments completed by the end of Reading Week in February (21-25, 2011), to allow sufficient time for data analysis, preparing your presentation and writing your thesis (journal manuscript format).

**Safety training** – Please ensure that students have taken the core/update WHMIS, Fire Training, Biosafety and all other relevant safety courses prior to starting in the lab.

**ACADEMIC DISHONESTY**: Please refer to the [Statement on academic ethics](http://library.mcmaster.ca/search/) and the [Senate resolutions on academic dishonesty](http://library.mcmaster.ca/search/) found in the Senate policy statements as distributed by the Senate office. Plagiarism of your classmate’s work (be it from this year or previous years), or any text from books, the web, tests or papers, is unacceptable conduct and is subject to penalty if observed by the course professor or assistants.
Mid-year laboratory work (and overall research ability) evaluation

For Biochemistry 4B06, 4F09 and 4R12

( PLEASE RETURN TO MIZAN GRAHAM IN HSC 4N45 NO LATER THAN NOVEMBER 29, 2010 )

Student Name (please print): ___________________________________________

Committee Member: ________________________________________________

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<td>2. Familiarity with relevant literature</td>
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<td>4. Work habits</td>
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<td>6. Work completed and its significance</td>
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<td>7. Data analysis interpretation</td>
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<td>8. Industriousness</td>
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<td>9. Experimental judgment</td>
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Overall ability (numerical score out of 100)

Final laboratory work (and overall research ability) evaluation

For Biochemistry 4B06, 4F09 and 4R12

(PLEASE RETURN TO MIZAN GRAHAM IN HSC 4N45 NO LATER THAN APRIL 5, 2011)

Student Name (please print): ___________________________________________

Committee Member: _________________________________________________

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Overall ability (numerical score out of 100)
Initial Meeting Form DUE SEPTEMBER 13, 2010!!!!

Please take the time with your student to summarize the outcome of the following discussion topics. Please hand in this sheet to Mizan Graham in HSC 4N45.

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

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

**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):

**Expectations of supervisor:**

**Expectations of student:**

**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____________________
Evaluation of Thesis (Journal Article)

For Biochemistry 4B06, 4F09 and 4R12

The journal article 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 presentation based on the journal article guidelines provided, literature, citation, etc.

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

Student Name: ____________________________________________________________

Committee Member: ________________________________________________________

Final Mark (/25):___________________________

Comments:
McMaster University Undergraduate Innovation Journal

Guidelines for submission of thesis in the form of a journal article (Biochemistry 4B06, 4F09 and 4R12 students)

Introduction:

The 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. The McMaster University Undergraduate Innovation Journal is currently accepting manuscripts from all Biochemistry 4B06, 4F09 and 4R12 students. Below is a detailed description of the submission guidelines which must be followed by each student.

All manuscript submissions must be handed in by the specified due date (April 5, 2011) no LATER than 3:00pm in the designated 4B06/ 4F09/4R12 drop boxes (black cabinet besides HSC-4H39). You must submit 1 paper copy to your supervisor, 2 paper copies to Mizan Graham and 1 electronic copy to Mizan Graham.

Formatting Guidelines:

- Manuscript must be formatted for 8.5 x 11 inch paper.
- Text must be formatted as Times New Roman font size 11 with double spacing throughout.
- The entire thesis CANNOT EXCEED 25-pages (MAXIMUM LENGTH!!!), double-spaced with 1-inch margins all around. This includes all sections from Abstract to Discussion but excludes References to Supplemental Data.
- All pages must 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
  - Abstract
  - Introduction
  - Materials and Methods
  - Results
  - Discussion
  - References
  - Abbreviations
  - Figure Captions
  - Tables
  - Figures
  - Supplemental data (If applicable)

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

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

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. The introduction should not exceed one page (using this format). Diagrams explaining your points are highly recommended (they must be original creations NOT copied from other sources!)

Materials and Methods: should be concise and easy to follow so that your experiments could be repeated by another student. The experiments must 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.

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 that should not exceed two typed pages.

**References**: should be cited throughout the text by number, example (1). The references should follow the JBC (Journal of Biological Chemistry) format.

**Abbreviations**: All abbreviations used in the text should be written out in long form the first time they are introduced, example PCR (polymerase chain reaction). 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 (e.g. mean ± sem). All figures should be high quality and should be created with applications capable of producing high resolution files (TIFF files). These applications include Adobe Illustrator, Corel DRAW or OpenOffice Draw (free). This does NOT include PowerPoint or Word! To learn how to convert images from PowerPoint to another application please follow the link provided: [https://rapidsubmission.cadmus.com/jbc/JBC%20PowerPoint%20Update.pdf](https://rapidsubmission.cadmus.com/jbc/JBC%20PowerPoint%20Update.pdf)

For graphic images and other image specifications we have adopted the policy outlined by Journal of Cell Biology.

**Copied from JCB instructions to authors** ([http://www.jcb.org/misc/ifora.shtml](http://www.jcb.org/misc/ifora.shtml)):

**Image acquisition and manipulation.** The following information must be provided about the acquisition and processing of images:

1. Make and model of microscope
2. Type, magnification, and numerical aperture of the objective lenses
3. Temperature
4. Imaging medium
5. Fluorochromes
6. Camera make and model
7. Acquisition software
8. Any subsequent software used for image processing, with details about types of operations involved (e.g., type of deconvolution, 3D reconstructions, surface or volume rendering, gamma adjustments, etc.).

**Numerical data.** Error bars on graphic representations of numerical data must be clearly described in the figure legend. The number of independent data points (N) represented in a graph must be indicated in the legend. Numerical axes on graphs should go to zero, except for log axes. Statistical analyses should be done on all available data and not just on data from a "representative experiment". Statistics and error bars should only be shown for independent experiments and not for replicates within a single experiment.

**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.
Writing Styles (requirements for a comprehensive journal article)

The following is a compilation of excerpts obtained from the following website:
http://grcpublishing.grc.nasa.gov/editing/chp2.CFM

Please visit the website for more details.

Before you start writing your journal articles print out all your relevant data figures and tables and take a moment to arrange them in the order you feel conveys the most logical story. This story should be clear and concise with a set objective that is laid out in a continuous manner – this will probably not be the order in which you performed the experiments. Below is an excerpt from the website mentioned above that describes the meaning of clarity, conciseness, continuity and objectivity:

Clarity

The purpose of a technical report is to transmit conclusions and their supporting evidence. To do this, your report must convey your exact meaning to the reader. The text must be clear and unambiguous, mathematical symbols must be fully defined, and the figures and tables must be easily understood.

Clarity must be met from the readers’ point of view. What may be clear to you as the author may not be clear to your readers. Remember, you are intimately familiar with the work, but they are not. You must continually reexamine your rough drafts with a reader’s critical eye. Readers will not tolerate confusion. They must never become uncertain about what you are discussing, why you are discussing it, or what your plan of presentation is. They will rebel if forced into these mental gymnastics. If there is any discontinuity without proper explanation, the average reader will lay aside the report for later reading. Once this happens, the chances are slight that it will ever be read. You usually have just one chance to sell the reader on the report’s objectives. And that requires a presentation that is logical, simple, and systematic.

Conciseness

Most of your intended readers are busy. Therefore your reports should be concisely written. That is, your story should be told with the fewest possible words and illustrations. Help your readers by omitting everything irrelevant to the results and conclusions. Do not be disappointed if a report that describes a lengthy program is only a few pages long: Report quality is often inversely related to report length. Your readers will be interested in your conclusions and the supporting evidence and will want to get these as quickly as possible. They will not be particularly interested in any problems you had in getting the results. Explaining such problems usually just hides the important aspects of the report.

On the other hand, do not condense reports at the expense of your readers’ understanding. Give enough information to enable them to understand clearly what you are describing and why you are describing it. Include enough background information to make the context clear. Do not assume that they will remember details of a previous report—or have even read it. Include all details needed to understand the current report. In short, make your reports brief but comprehensible.

Continuity

Reports should tell a complete story as logically and interestingly as possible. This requires continuity between succeeding sentences, paragraphs, and sections and between the written text and the figures and tables. Transitional words, phrases, sentences, or even paragraphs may be needed to lead your readers through the story. But overusing transitions can slow the pace of your narrative.

Carefully choose the places at which you refer to figures and tables to limit distraction. Making these references at the beginning or end of a discussion is usually preferable.

Objectivity
Technical reports should be objective and show restraint. Be honest with your readers. They will become suspicious if they detect hidden meanings or any type of subterfuge, and you will then have little chance of convincing them of your conclusions. They expect you to evaluate the data honestly. Do not try to hide deficiencies in your research. No technical report is better than the research on which it is based. Tell your readers frankly what your assumptions were, what your probable errors are, and what you may not understand about the results.

In addition to being honest, be tactful. If you are faced with the problem of presenting technical results that may conflict with previous results or with the personal prejudices of some readers, refrain from making dogmatic statements and avoid sounding egotistical. Your readers will be persuaded by facts, but they may become irritated if you attempt to impress them with your cleverness or to claim credit for accomplishments. Write to express, not to impress.

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

http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWtoc.html
NOTE: if you miss your presentation time you will receive an automatic zero on the presentation.

FIRST ORAL PRESENTATION – November 15 to 22, 2010 (worth 10%)

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. Due to time constraints, students will not be able to use their personal laptop. If you plan to use movies or Flash-animation in your presentation, contact Felicia Vulcu to arrange to test the movies on the presentation-laptop at least two days before 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 of their presentation. Late penalty: 10%/hour. The presentations will be loaded to the departmental laptop that will be used for all presentations. Each presentation will last 15 min with 6-7 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 not be included in the presentation without being clearly identified and acknowledged. Only the course coordinator and the 4F09/4R12 supervisors will be in attendance. Each student will be evaluated by a committee consisting of the attending supervisors. The supervisor will be on the committee as a non-voting consultant, but will not be involved in assigning a grade for the oral presentations.

Students will be evaluated based on their:
- Understanding of the background and context of their project
- Clarity of the presentation
- Ability to answer questions
- Knowledge of the experimental approach
- Future research plans and understanding of alternative approaches should they hit an impasse

The members of the committee will be asked to fill out and submit an ‘Evaluation of Oral Presentation’ form to Mizan Graham at the conclusion of the oral presentations.

SECOND ORAL PRESENTATION – March 21 to 28, 2011 (worth 15%)

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.

This second presentation will be early enough for any comments or questions raised to be considered in the written thesis. 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 of their presentation. Late penalty: 10%/hour. The presentations will be loaded to the departmental laptop that will be used for all presentations. If you plan to use movies or Flash-animation in your presentation, Felicia Vulcu to arrange to test the movies on the presentation-laptop at least two days before your presentation. Each presentation will last 15 min with 6-7 minutes of questions and discussion. Any work done during summer months or prior to the beginning of the project should not be included in the presentation without being clearly identified and acknowledged. Only the course coordinator and the 4F09 supervisors will be in attendance. Each student will be evaluated by a committee consisting of the attending supervisors. The supervisor will be on the committee as a non-voting consultant, but will not be involved in assigning a grade for the oral
presentations. 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 the same criteria as their first presentation. Students and supervisors will be notified of the exact date, time and location of the presentations in February. Please check the 4F09 A2L folder weekly for updates.

**Students will be evaluated based on their:**
- Understanding of the background and context of their project
- Clarity of the presentation
- Ability to answer questions
- Knowledge of the experimental approach
- Critical evaluation of their data and project
EVALUATION OF ORAL PRESENTATION

BIOCHEMISTRY 4F09/4R12

NOTE: if student is late, the penalty is 10% / minute with a zero on the presentation after 10 minutes. If student misses their time slot they receive an automatic mark of zero.

Date _____________________________________________________

Student Name: __________________________________________________________

Committee Member: _____________________________________________________

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<tr>
<th>CRITERIA</th>
<th>MARK (/ 4)</th>
<th>COMMENTS!!!!</th>
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<tr>
<td>1. Understanding the background</td>
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<tr>
<td>2. Understanding the problem and its significance</td>
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<tr>
<td>3. Knowledge of experimental approach</td>
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<td>4. Experimental progress made (if progress made is inadequate, then the main reasons for it)</td>
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<td>5. Ability to interpret/ analyze results</td>
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<td>6. Ability to answer questions</td>
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<td>7. Overall presentation (includes flow of presentation/ clarity of slides/ quality of slides/ references/ grammar and technical language)</td>
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<td>TOTAL (/ 28)</td>
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Note: 1 = unsatisfactory, 2 = satisfactory, 3 = good, 4 = excellent. A mark of 0 can be given if student does not meet the criteria specified.

PLEASE FOLLOW THE SPECIFIED MARKING SCHEME. THANK YOU.

YOU MUST COMMENT on each criterion (give reasons/ feedback for EACH mark)
Poster Presentation Requirements for Biochemistry 4B06

Poster Presentation (March 29, 2011; worth 25%; location: To Be Announced) – The poster presentation should describe the research project, the results obtained and their significance. Each poster will be evaluated by two members of the evaluation committee which will NOT include the student’s supervisor. The members of the evaluation committee are asked to fill out and submit a “Poster Evaluation” form to Mizan Graham within 2 days of the presentations. Students will be asked to present their poster to the members of the evaluation committee and answer any questions regarding their research. Any work done during summer months or prior to the beginning of the project should not be included in the presentation without being clearly identified and acknowledged.

Students will be evaluated based on their:

- Poster presentation
- Understanding of the background
- Ability to answer questions
- Knowledge of the experimental approach
- Ability to analyze results
- Progress

The size of the poster display should be restricted to 4 feet wide x 3 feet tall. Each poster should contain the following information:

1. Title (1-2 lines) – describing the objective of the research work (keep it clear, concise and straight to the point)
2. Abstract (300 words) – clearly define the goal of the project and summarize the findings in the context of the field.
3. Introduction/Background (1 page, use a diagram to describe your project as relating to the field if possible) – summarize the field and how your part relates to it (do not go into details not pertinent to your goal).
4. Results – obtained thus far (or methodology developed) and their interpretation and significance. Here you must design figures that are clear to see/understand with few words and directed headings/figure captions.
5. Conclusion/discussion – 100-150 words (or a diagram) to summarize your main findings and future goals given your data.
6. Key references – relevant to the work (the word “key” is important as you don’t want to take up valuable poster space including every reference in your field).
**Poster Evaluation**

Biochemistry 4B06

NOTE: If student either does not produce a poster, or does not show up to present their poster they receive an automatic mark of zero.

Student Name: __________________________________________________

Committee Member: ______________________________________________

<table>
<thead>
<tr>
<th>Criteria (maximum marks = 4*)</th>
<th>Marks (/4)</th>
<th>COMMENTS!!!</th>
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<tbody>
<tr>
<td>1. Understanding the problem and its significance (4 marks)</td>
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<td>2. Experimental progress made (if progress made is inadequate please specify in the comments section reasons why) (4 marks)</td>
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<td>3. Ability to interpret/analyze results (4 marks)</td>
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<td>4. Ability to answer questions (4 marks)</td>
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<tr>
<td>5. Overall presentation (includes flow of poster/ clarity of poster/ quality of poster/ references/ grammar and technical language) (4 marks)</td>
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</tbody>
</table>

Total marks (/20)

* Note: 1 = unsatisfactory, 2 = satisfactory, 3 = good, 4 = excellent. A mark of 0 can be given if student does not meet the criteria specified. PLEASE FOLLOW THE SPECIFIED MARKING SCHEME. THANK YOU.

YOU MUST COMMENT on each criterion (give reasons/ feedback for EACH mark)