Course Coordinator:
Dr. Felicia Vulcu (vulcu@mcmaster.ca), ext. 22838, HSC 4H43

Administrative Assistant contact email:
biochemistryadvisor@mcmaster.ca

Course Guidelines

The department of Biochemistry and Biomedical Sciences considers research to be a vital component of an undergraduate education in Biochemistry. Biochemistry 3A03 offers students the opportunity to gain valuable research experience and provides excellent preparation for a future in industry or graduate school. The course is a twelve week research project that can be undertaken in a laboratory during the fall, winter or summer term. Students are responsible for arranging a suitable project, location and agreement of a supervisor. To obtain permission of the department to take this course, students must complete and submit the required permission form and one-page research proposal to the Undergraduate Program Office in HSC 4H45. The permission form can be found on this website: http://fhs.mcmaster.ca/biochem/undergraduate/forms_and_procedures.html

The following information will help in the selection of an appropriate research project and potential supervisor.

Course Basics
This research course will require at least as much time as a regular course for which you receive 3 units of credit and differs from a regular course in terms of the more independent nature of the work, and the degree of student responsibility and initiative. Assessment in this course is based on laboratory work (approximately 12 hours per week in one term) and a final written report.

Course Registration
Students may register for this course during the summer, fall or winter term, and pending permission of the department, may complete the course requirements during the summer term. Should students complete the course during the summer months, the 12 week/144 hour work requirement may be condensed into a 4 week period of full-time work with the agreement of the supervisor. Students may not receive remuneration for the coursework, but may be compensated for any time that the supervisor wishes to employ the student beyond completion of the course requirements.

Making Arrangements for a Research Supervisor and Project
Students are responsible for making arrangements with a suitable supervisor and research project. The work may be undertaken in a research laboratory here at McMaster or at any institution, provided that the supervisor’s research is in a field related to Biochemistry, Biomedical Sciences, Molecular Biology or Genetic Engineering. For a full listing of members and associate members in the Department of Biochemistry and Biomedical Sciences, please refer to http://www.fhs.mcmaster.ca/biochem/people/faculty/index.php.

The supervisor should be provided with this information/evaluation package and agree to supervise the student for the full term, and submit an evaluation at the end of the term, based on laboratory performance and a final written report.
Acknowledgement of Previous Work Related to the Project
Students who may have previously worked in the same laboratory in which they are completing the requirements for Biochemistry 3A03 are asked to provide a one-page summary of any work that is related to the project being undertaken for Biochemistry 3A03. This summary should be submitted with the research proposal. Any work completed prior to the student’s registration in Biochemistry 3A03 should not be included as part of the student’s evaluation or final report without clearly identifying and acknowledging it.

Laboratory Performance
To ensure the greatest success with their project, students will be expected to spend an adequate number of hours in the laboratory each week (approximately 12 hours per week). Problem-solving, creativity, innovation and good experimental technique are the qualities of a good scientist. Students are encouraged to explore alternative interpretations of data or to suggest what line of investigation should be next.

Safety in any laboratory setting is first and foremost. Before performing any protocol, students should be familiar with the materials, reagents and possible hazards involved in the experiment. Students are reminded to consult the Material Safety Data Sheets (MSDS) for each reagent that they use.

Safety Training and Liability Issues
Appropriate safety training (ie. WHMIS, Radiation Safety) must be completed prior to beginning laboratory work. It is the responsibility of the lab supervisor to ensure that students have received the required safety training. Should you complete your course requirements outside of McMaster University, you must also complete the required Risk Management forms, available in HSC 4H45.

The Final Report
The final report must be submitted directly to the lab supervisor for evaluation NO LATER than the following dates:

Term 1: Monday December 10th, 2012
Term 2: Tuesday April 16th, 2013

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 remainder of the guidelines are strong suggestions to aid in constructing the overall flow of the report (the due date is NOT a suggestion: it is a requirement). Students should consult their lab supervisors about the specifics of their report construction.

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 report SHOULD NOT EXCEED 20-25 pages (MAXIMUM LENGTH!!!), double-spaced with 1-inch margins all around. This includes all sections from Abstract to Discussion (see below) but excludes References to Supplemental Data.
• All pages should be numbered (bottom, centre, (1, 2, etc.))
• The outline of the manuscript should follow this order:
Abstract
Introduction
Materials and Methods
Results (you can combine the results and discussion sections if you wish)
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. 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 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 the JBC (Journal of Biological Chemistry) format or 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 (e.g. mean ± sem). All figures should be high quality.

Academic Integrity: You are expected to exhibit honesty and use ethical behavior 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.

Note: 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.

Please retain this information for future reference.
Course Requirements and Timetable for Biochemistry 3A03

- SEEKING DEPARTMENTAL PERMISSION
  The student should arrange a meeting with his/her supervisor to discuss the research project, course requirements, work schedule, and the expectations of the supervisor. Having made arrangements with a supervisor, students must complete and submit the required permission form with one-page research proposal and the supervisor/student agreement form to the Undergraduate Program Office in HSC 4H45 to allow sufficient time for departmental approval before registering for the course.

- ACKNOWLEDGEMENT OF PREVIOUS WORK
  If the student has previously worked in the same laboratory, a one page summary of prior work that is related to the project being undertaken must be submitted with the permission form.

- SAFETY TRAINING AND RISK MANAGEMENT FORMS
  Appropriate safety training must be completed prior to beginning laboratory work. Should you complete your course requirements outside of McMaster University, you must also complete the required Risk Management forms and submit these to HSC 4H45 before beginning the project. Please see the course coordinator regarding this important issue.

- SUBMISSION OF FINAL REPORT
  The final report is due: Term 1: Monday December 10th, 2012; Term 2: Tuesday April 16th, 2013. A hard copy should be submitted directly to your supervisor for evaluation. Late submissions will NOT be accepted (a mark of ZERO will be assigned). Some allowances will be made on a case-by-case basis if an MSAF (http://mcmaster.ca/msaf/) APPROVAL from the Associate Dean’s office for missed work is received.

- FINAL PROJECT EVALUATION
  The supervisor will fill out and submit the final ‘Project Evaluation’ form in a sealed and signed envelope to the student. The final grade will be based upon the evaluation of a combination of the student’s lab work (experiment, result, interpretation) and final report, and will count for 100% of the final mark.
  Supervisors will evaluate their students based on:
  1. Understanding of the problem
  2. Familiarity with the relevant literature
  3. Initiative
  4. Work habits
  5. Ability at research
  6. Data analysis interpretation
  7. Industriousness
  8. Experimental judgment
  9. Written skills
  10. Quality of the final report
  The supervisor is asked to submit the evaluation form to the course administrator in HSC 4H45 before the date designated on the supervisor/student agreement form. The student may also request a copy of the evaluation from the supervisor.
Permission Form for Biochemistry 3A03  
Department of Biochemistry and Biomedical Sciences  
McMaster University  

STUDENT INFORMATION

Student Name: _____________________________________  
Student Number: _____________________________________  
Email Address: _____________________________________  
Current Program:  
☐ Biochemistry  
☐ Biochemistry (Biomedical Sciences Specialization)  
☐ Biochemistry (Biotechnology Specialization)  
☐ BHSc (Biomedical Sciences Specialization)  

Indicate the term in which you will register for 3A03:  
☐ term I  
☐ term II  
☐ summer term  

SUPERVISOR INFORMATION

Supervisor’s Name: _____________________________________  
Supervisor’s Institution: ___________________________________  
Mailing Address:  
______________________________________  
______________________________________  
______________________________________  
______________________________________  
Phone Number: _____________________________________  
Email Address: _____________________________________  

PROJECT INFORMATION – Please attach the one-page research proposal

Project Title: _____________________________________  
Start and End Dates: _____________________________________  
Supervisor’s Signature: _____________________________________  

This form should be submitted to the Undergraduate Program Office in HSC 4H45.

For Departmental use:

☐ Acknowledgement of Previous Work  
☐ Safety Training  
☐ Risk Management Forms (if applicable)  
☐ Permission of the Department – Signature _____________________________________
Supervisor/Student Agreement Form
Biochemistry 3A03
Department of Biochemistry and Biomedical Sciences
McMaster University

STUDENT INFORMATION

Student Name: _____________________________________

Student Number: _____________________________________

SUPERVISOR INFORMATION

Supervisor’s Name: ___________________________________
Supervisor’s Institution: ________________________________

PROJECT INFORMATION

Project Title: _______________________________________

Start and End Dates: _________________________________

Evaluation Due Date: _________________________________

AGREEMENT

By signing this agreement form, the supervisor and student agree to the course guidelines set out by the Department for Biochemistry 3A03, and to submit the final evaluation form by the above designated date.

Supervisor’s Signature: ________________________________

Student’s Signature: _________________________________

The completed form should be submitted to the Undergraduate Program Office in HSC 4H45. A copy should also be retained by the student and supervisor.
Project Evaluation
for Biochemistry 3A03

Please return this evaluation either electronically (email: biochemistryadvisor@mcmaster.ca) or in a sealed and signed envelope to the Undergraduate Program Office in the Department of Biochemistry and Biomedical Sciences (HSC 4H45) NO LATER THAN Tuesday April 23rd 2013.

Student Name: ____________________________ Student Number: _______________
Supervisor Name: ___________________________________________________________
Supervisor Signature: _______________________________________________________

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<th>PLEASE COMMENT IN THE SPACES PROVIDED BELOW</th>
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<tr>
<td>1. Understanding the problem</td>
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<td>2. Familiarity with relevant literature</td>
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<td>3. Initiative</td>
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<td>4. Work habits</td>
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<td>5. Ability at research</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>9. Experimental judgment</td>
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<td>10. Written skills and overall quality of report</td>
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Overall ability (numerical score out of 100)