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

Administrative Assistant contact email:
biochemistryadvisor@mcmaster.ca

Course Guidelines

Research is a vital component of an undergraduate education in Biochemistry and Biomedical Sciences. Biochemistry 3R06 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 full year research project that is undertaken in the laboratory of a member of the Department of Biochemistry and Biomedical Sciences. Students are responsible for finding a supervisor for the course. To obtain permission from the department to take this course, students must complete and submit the required permission form 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 a potential supervisor.

Course Basics:

This research course will require at least as much time as a regular course for which you receive 6 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 over two terms) and a final written report.

Making Arrangements for a Research Supervisor

Students are responsible for finding a supervisor in the Department of Biochemistry and Biomedical Sciences. For a full listing of members and associate members, 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 year, 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 3R06 are asked to provide a one-page summary of any work that is related to the project being undertaken for Biochemistry 3R06. This summary should be submitted with the permission form to the Undergraduate Program Office (HSC 4H45). Any work completed prior to the student’s registration in Biochemistry 3R06 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 the 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 (i.e. WHMIS, Radiation Safety) must be completed prior to beginning laboratory work. It is the responsibility of the lab supervisor to ensure all undergraduate 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 undergraduate students are being supervised during their time in the lab. If you require more information on this subject please ask your lab supervisor or contact Jodi Biro on the Biochemistry Department (HSC 4N59) or the FHS safety office (HSC 1J11).

**The Final Report**
The final report must be submitted directly to the supervisor NO LATER THAN **April 16th, 2013** for evaluation.

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 these 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:
  - 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

**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.

**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.

**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](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 3R06

□ 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 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. Student must consult with the lab supervisor for safety training specifics.

□ SUBMISSION OF FINAL REPORT
The final report is due NO LATER THAN April 16th, 2013. A hard copy should be submitted 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 Undergraduate Program Office in HSC 4H45 NO LATER THAN Tuesday April 23rd, 2013. We prefer electronic copies.

The student may also request a copy of the evaluation from the supervisor. 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
# Project Evaluation

For Biochemistry 3R06  
2012-2013

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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**Overall ability (numerical score out of 100)**