Molecular Biology 3V03

TECHNIQUES IN MOLECULAR GENETICS

FALL 2016

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Course Goals
The goal of this course is for students to gain experience in performing diverse molecular genetic techniques, and hone their critical thinking and research skills.

Lectures/tutorials
Lectures will be held on Fridays (8:30 am – 9:20 am in BSB 117), where we will discuss the theory behind the up-coming labs, the techniques that will be used (along with alternative strategies that could be employed), and controls that will be important for experimental interpretation.

Labs will be held every Tuesday and Thursday, from 2:30 pm – 5:30 pm in LSB 102 and LSB 103.

Laboratory Working Groups and Work Organization
For most experiments, you will be working in pairs. Everyone will be doing the same experiments each week; however, there will occasionally be choices for people to make regarding experimental direction, and consequently, experimental outcomes may differ. If an experiment does not work the first time, there may be time to repeat it; however, this will depend on both time and resource availability. Molecular biology/genetic-type experiments are by nature quite sophisticated, and as a result, total experimental failure is a real possibility (as it is in any research lab – things don’t give you the results you expect ~90% of the time!). While we hope this isn’t the case for any of you, we have back-up plans in place for everything, so no one/group will ever be left behind.

The labs are scheduled for two afternoons per week. You will occasionally need to come into the lab for brief periods of time outside of the two scheduled afternoons. We would please ask that if you are working as a group, that group members divide up this extra time equitably.

It is expected that you will have read over the material for each week’s lab prior to the first lab of the week. You will be doing a short quiz (before the lab starts, and occasionally online) most weeks, focusing on topics/questions that are important for the up-coming week’s labs. Any online activities will be due before the labs begin for the week.

This course is being taught by Dr. Marie Elliot

The Teaching Assistants for the course are: Daniel Hsieh and Danielle Sexton.

The Instructional Assistant is Alison Cowie.

The Technical Assistant is Arlene Sutherland.

Dr. Elliot will have office hours once per week (9:30-11:00am on Fridays) in LSB 329. If you are unable to meet during this time, please contact Dr. Elliot (email, or in-class) to discuss alternative arrangements.

We are all here to help you, so please ask questions!! - we will try to give you clear, thorough answers, and/or help get you pointed in the right direction.
EVALUATION

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Lab notebook:</td>
<td>15%</td>
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<tr>
<td>Draft documents:</td>
<td>5%</td>
</tr>
<tr>
<td>Lab reports (2):</td>
<td>30%</td>
</tr>
<tr>
<td>Online Activities/Completion of Case Studies</td>
<td>15%</td>
</tr>
<tr>
<td>Exam:</td>
<td>20%</td>
</tr>
<tr>
<td>Lab performance:</td>
<td>15% (competence, pre-lab quizzes, peer evaluation)</td>
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LAB NOTEBOOK (15%)

It is critical that you take notes in the lab WHILE YOU ARE DOING THE WORK.

These notes should be written into a laboratory notebook as you do the work. They should contain:
- a sentence on the objective of the experiment
- the date when each experiment was performed (this can often be one of the most useful pieces of information in a lab notebook)
- reagents added (and volumes of each) for enzyme reactions/assays performed (e.g. PCR, restriction enzyme digestions, ligations, EMSAs)
- other technical numerical information such as incubation times (start, end, duration), temperatures, PCR programs, antibiotic concentrations in the plates, agarose gel percentages, etc.
- any modifications of the procedure or ways in which you deviated from the manual
- expectation of experimental outcomes (e.g. anticipated PCR product size)
- the results you obtained (in the form of the data as you actually obtained them), with everything very well labelled (e.g. what is shown in each lane of your gel picture?)
- a conclusion, stating what the experiment showed (and whether it matched what you predicted the outcome would be)

These sorts of notes are incredibly important when trying to troubleshoot experimental problems. Getting comfortable with this now will help you tremendously in future lab work (coop terms, thesis positions, etc.).

To encourage you to follow these recommendations, your lab notes will be signed at the end of each class by your TA, and will be evaluated twice during the term (once over the mid-term break, and once at the end of term).

A sample page has been provided for you in the ‘Helpful Information’ section on Avenue.

LAB REPORTS (30%)

There will be two full lab reports. To help you get a sense for our expectations, you will be asked to prepare parts of the 1st report in advance (by specified dates), and will receive feedback on these parts.

Draft documents: 5% - Figure preparation
- Introduction outline
1\textsuperscript{st}: 15\% \hspace{1cm} \textbf{Experiment 1} (the expectation will be that all feedback from the draft documents will have been incorporated into your final report)

2\textsuperscript{nd}: 15\% \hspace{1cm} \textbf{Experiment 2}

You can find more detail about the lab reports, and what is expected to go into them (along with excellent examples) in the ‘Helpful Information’ section of Avenue.

\textbf{QUIZZES/ACTIVITIES (20\%)}

Many of the lecture classes will be associated with online quizzes on the theory behind the week’s labs. These are intended to provide you with an opportunity to practice different skills (both technical and critical-thinking types), and to give me feedback on areas where some additional discussion might be useful.

\textbf{EXAM (20\%)}

The Final Written Exam will deal with both theory and practice of the material covered in the lectures and laboratory exercises.

\textbf{LAB PERFORMANCE (15\%)}

This mark will encompass a number of different factors/components, including (but not limited to):
- performance on competence exercises
- performance on self-directed aspects of the labs
- lab citizenship (e.g. cleaning up after yourself)
- pre-lab quizzes/activities
- peer evaluation on your contribution to lab work

\textbf{READING}

While Techniques in Molecular Genetics (Mol Biol 3V03) is a laboratory course, both the techniques we use, and the questions we are addressing, are based on previous work by many groups. Reading up on the background of the techniques and experiments will help to ensure that you have a deeper understanding of what you are doing (and why), and a better appreciation for where your experiments fit in the bigger picture.

To ensure that everyone is at the same level, there will be some assigned reading material – but you are encouraged to find additional sources at all stages! If you find an article or book chapter that you think is particularly helpful or interesting, please share it with us – and your colleagues!
**Statement on Academic Dishonesty**

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and 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 kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at:

http://www.mcmaster.ca/univsec/policy/AcademicIntegrity.pdf and the student information of the Office for Academic integrity http://www.mcmaster.ca/academicintegrity/

McMaster University considers academic dishonesty to be a very serious matter. Instructors will seek to identify instances of academic dishonesty, charge those responsible and impose the appropriate penalty as defined by Senate regulations. It is your responsibility to ensure that you are aware of what McMaster University considers academic dishonesty.

**Information for Anyone Requiring Accommodations**

Everyone associated with this course is committed to the success of all students enrolled. If you require any accommodations, please let the course instructor know at the start of the term (or as soon as you receive a diagnosis and documentation from Student Accessibility Services).