Instructor, Zoom Meetings for Office Hours and Prelab Lectures:
Dr. Ming-Mei Chang, ISC 352 (office)/ 346 (lab), Phone: 245-5416, Email: chang@geneseo.edu

Virtual Office Hours:
Monday (1-2:30 pm)
https://geneseo.zoom.us/j/99968735373?pwd=ZDhEbWl0S050VGYVRmM1pJbW84U1dXUT09
Meeting ID: 999 6873 5373 Passcode: 992807

Thursday (10-11:30 am)
https://geneseo.zoom.us/j/93898474356?pwd=b1JkWjZIYXJ6WVkvzNDNGRUlhSEIWUT09
Meeting ID: 938 9847 4356 Passcode: 361880

Prelab Lecture: Tuesday / Thursday (1-2 pm)
https://geneseo.zoom.us/j/97501810070?pwd=S1RZVGdlcU9rREJBL2RySXhBamRidz09
Meeting ID: 975 0181 0070 Passcode: 776194

Learning Outcomes:
Techniques for studying molecular biology have advanced rapidly and continued to evolve. From previous courses, you might have learned about various molecular techniques without hands-on experience. This lab course will provide you opportunities to practice some common molecular techniques used in research. Since this is a 2-credit lab course, each lab consists of a pre-laboratory lecture on background information, which will be conducted through zoom meetings, followed by the hands-on lab exercise.

Three major course-learning outcomes are:

To practice and understand basic molecular techniques commonly used in research
You will learn techniques in DNA isolations and quantifications, degenerate PCR cloning, microbial culture, restriction digest, agarose gel electrophoresis, DNA extraction from agarose gel, synthesis of Dig-labeled DNA probe, Southern blot analysis, web-based sequence analysis, RNA isolation and quantification, reverse transcription, and realtime PCR. Your understanding of the background information and efforts that you put into the course are as important as the experimental results. After completing this course, you should understand each topic covered and can carry out the associated technique independently. Most important, you can apply what you learn to perform similar experiments in molecular biology research when needed.

To gain skills in collecting, analyzing, interpreting and communicating experimental data with others
You are required to keep a well-written weekly lab note that includes all the information and data of each lab. You will use the content to write up three lab reports following the format of 1st scientific research papers.

To be able to work as a team
Most if not all biological studies, particularly in the field of molecular biology, are done through teamwork. In this lab, you will work as a group of two. The joint effort between you and your partner is required for successful completion of each lab. Make sure that you are a good team player.

Course Materials and Supplies:
A 3-ring binder, notebook or loose-leaf notepaper, Sharpie fine point permanent marker, lab coat and a pair of UV-resistant glasses/goggles are required. I will post lab protocols in Canvas every week. Please PRINT, READ, and PLACE it in the 3-ring binder and BRING to the lab. Searching and following protocols on your electronic devices while carrying out the steps are prohibited because that often results in experimental errors. It is also a good practice to make a physical mark as you complete each step in a complicated multi-step procedure. Due to the current COVID-19 pandemic, in addition to keeping social distance, we need to protect ourselves and minimize the risk of spreading illness by wearing masks all the time.
Grading:

- Organized Lab Note: 15%
- Group Homework: 25%
- Three Group Lab Reports: 30%
- Three Quizzes: 25%
- Lab Performance: 5%

A (100-93%)  A (92.9-90%)  B* (89.9-87%)  B (86.9-83%)  B (82.9-80%)
C* (79.9-77%)  C (76.9-73%)  C (72.9-70%)  D (69.9-60%)

Organized Lab Note (LN)

You should organize your experimental results in a format of electronic copy containing detailed information about each lab, which is useful for lab write-up later. Keeping up your lab note writing should be an on-going activity throughout the semester. You need to i) write clearly and show obvious care taken to make it easy to understand; ii) have each lab note in A PROPER ORDER specified below:

- **DATE, TITLE, NAME and LAB PARTNER** on the top of the FIRST page
- **PURPOSE/OBJECTIVES**
- **RESULTS:**
  a. Record the RAW DATA during the lab and organize them into
     - TABLES with TITLES on the TOP and/or FOOTNOTES at the BOTTOM, or
     - FIGURES labeled properly with LEGENDS containing TITLES followed by a brief DESCRIPTION at the BOTTOM or on the SIDE.
  b. Show all your CALCULATIONS.
  c. Briefly describe what you did or the no. of the protocol step when record an OBSERVATION.
- **INTERPRETATION and DISCUSSION**
  You should interpret/discuss your results but NOT repeat them. For examples, what do the results mean? Do you get the expected results? Why? Why NOT? This part is as important as the RESULTS because it shows your understanding of the lab exercise.

Group Homework (GH)

These are questions at the end of protocols to help you to understand the lab contents.

Three Group Laboratory Reports (LR)

Lab reports should be written according to the format of PRIMARY scientific research papers, which includes TITLE, ABSTRACT, INTRODUCTION*, RESULTS, DISCUSSION, and REFERENCES.

Three Quizzes

Each lab unit includes several exercises extending over multiple weeks with each exercise building on the foundation established in the previous week. After each lab unit, there will be a quiz covering its content.

All assignments are due at the **BEGINNING of the lab**. **No late LN or GH is accepted.**

**There will be a 10% penalty per day for each late LR.**

Accommodations:

SUNY Geneseo is dedicated to providing an equitable and inclusive educational experience for all students. The Office of Accessibility (Erwin Hall 22, (585) 245-5112, access@geneseo.edu) will coordinate reasonable accommodations for persons with physical, emotional, or cognitive disabilities to ensure equal access to academic programs, activities, and services at Geneseo. Students with letters of accommodation should submit a letter to each faculty member and discuss their needs at the beginning of each semester. Please contact the Office of Accessibility Services for questions related to access and accommodations.
Academic Policies of the Biology Department-ACADEMIC DISHONESTY:

You should be aware of and obey the College policies concerning academic dishonesty. Any alleged cheating and/or plagiarism may be dealt with by the School as a disciplinary problem in accord with College policies as stated in the Bulletin. Be especially aware that academic dishonesty includes putting your name on a group project that you did not contribute to and turning in lab reports where material is copied from reports from previous semesters’ classes. Beware- if your name is on a project, you need to be sure that the work is authentic and properly referenced; you are responsible if your partner has plagiarized material. The faculty of the School will take all necessary steps to deter academic dishonesty, all cases of which will be reported to the Dean of the School for possible disposition as a College disciplinary matter.

Tentative Schedule#:

<table>
<thead>
<tr>
<th>DATE</th>
<th>LAB EXERCISE</th>
<th>DUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/2, 4</td>
<td>Introduction</td>
<td></td>
</tr>
<tr>
<td>2/9, 11</td>
<td>Unit 1 Cloning Genomic nbs-Containing Sequences by Degenerate PCR</td>
<td>GH: introduction</td>
</tr>
<tr>
<td>2/16, 18</td>
<td>1-1 Genomic DNA Isolation and Degenerate PCR</td>
<td>LN: 1-1; GH: 1-1</td>
</tr>
<tr>
<td>3/2, 4</td>
<td>1-3 DNA Ligation and Bacterial Transformation (return next day, 5 min)*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Data Analysis and Discussion on Lab Write-up 1</td>
<td></td>
</tr>
<tr>
<td>3/9, 11</td>
<td>Rejuvenation Day- No lab</td>
<td>GH:1-3, LR 1</td>
</tr>
<tr>
<td>3/16, 18</td>
<td>2-1 Plasmid DNA Isolation and Quantification (start the night before, 15 min)*</td>
<td></td>
</tr>
<tr>
<td>3/23, 25</td>
<td>2-2 Agarose Gel Electrophoresis</td>
<td>LN: 2-1; GH: 2-1</td>
</tr>
<tr>
<td></td>
<td>Southern Transfer (return next day,15 min)*</td>
<td></td>
</tr>
<tr>
<td>3/30, 4/1</td>
<td>2-3 Isolation and Quantification of nbs-containing Insert from Agarose Gel Synthesis of Dig-labeled Probe by PCR</td>
<td>LN: 2-2; GH: 2-2</td>
</tr>
<tr>
<td>4/6, 8</td>
<td>2-4 Southern Hybridization and Detection (start the night before, 1 hr)*</td>
<td>GH: 2-3</td>
</tr>
<tr>
<td></td>
<td>2-5 Web-based Sequence Analysis and Discussion on Lab Write-up 2</td>
<td>LN: 2-4</td>
</tr>
<tr>
<td>4/13, 15</td>
<td>3-1 Total RNA Isolation and Purification; Quiz 2: Unit 2</td>
<td>LR 2</td>
</tr>
<tr>
<td>4/13, 15</td>
<td>Rejuvenation Day- No lab</td>
<td></td>
</tr>
<tr>
<td>4/20, 22</td>
<td>3-2 Reverse Transcription and Realtime PCR (RT-qPCR)</td>
<td></td>
</tr>
<tr>
<td>4/27, 29</td>
<td>3-3 Data Analysis of Unit 3 and Discussion on Lab Write-up 3</td>
<td>GH 3-2</td>
</tr>
<tr>
<td>5/4, 6</td>
<td>3-4 Quiz 3: Unit 3</td>
<td></td>
</tr>
<tr>
<td>5/10, 12</td>
<td>Quiz 3: Unit 3</td>
<td>LR 3</td>
</tr>
</tbody>
</table>

#Due to the COVID pandemic, the schedule is tentative and subjected to change. In addition, you are strongly discouraged to attend the in-person lab meetings if you are feeling unwell physically and there is no penalty for the non-attendance.

*These are schedule for you to work outside lab periods and you and/or your lab partner needs to be present.

COPY RIGHT
"Reproduction of materials from this course other than for your personal use without the author's consent is prohibited"