

Course Syllabus

BIO 323L: Laboratory Studies in Cell Biology

2016 Fall Semester

Unique Number 48560

Meeting Place Painter Hall 1.32 Tuesday 1-6

Laboratory Instructor: Dr. R. Malcolm Brown, Jr.
Office: Painter 2.34
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Teaching Assistants: Ash Nelson
PAI 2.26, Mondays 12-2 PM
Email: ash.nelson@utexas.edu

Laboratory Studies in Cell Biology satisfies Area 1 Blue List requirements for the cellular or molecular option for the B.A. degree in biology. This course also satisfies the requirement for an extensive writing component.

Required Materials:

- a) BIO 323L CLASS NOTES available at University Co-Op. *Be sure to obtain the Wednesday Class Notes.*
- b) Access to a modern word processing computer, preferably with a laser printer, for the preparation and processing of your laboratory reports. Strongly recommended: purchase of a computer with a color printer.
- c) Purchase of blank CDs for storage of digital images, notes, and downloads (students will be required to cover costs for printing of color images in the reports)

On Reserve:

Reference material will be on reserve in the Life Sciences Library under the course name, **BIO 323L**

Prerequisites:

For undergraduates: Six hours of Biological Science, including Biology 302; concurrent enrollment or credit for Biology 320 and an average grade of C in all biological sciences courses. We will verify these requirements with the Registrar. Please see Dr. R. Malcolm Brown, Jr. if there are any questions regarding prerequisites or enrollment in this course.

Course Objectives:

- (1) The student will gain a practical, hands-on experience in cell and molecular biology rather than reading about it in textbooks. This will be accomplished through data gathering, observations, and extensive writing in the form of a laboratory report.
- (2) The student should emerge from this course with a better appreciation for cellular and molecular biology and will be prepared from this experience to make informed decisions on future career choices in the biological sciences.

Course Statement:

We encourage the student in Biology 323L to develop an active participation in this laboratory experience. The class is sufficiently small that the student will have ample opportunity to get to know the instructor and teaching assistants, all of whom are dedicated to the premise that they can be of assistance and provide the learning experience of a lifetime for the student. In considering a given laboratory experiment, the student should try to understand **why** a particular experiment was chosen for study, **how** it may help to better understand a more general phenomenon, **where** the laboratory experience fits into the relevant experimental design and literature on the particular subject, and **who** in the field has contributed or is active in the research area. We hope that the student will energetically participate in class discussions and make suggestions for improving the next round of experiments. The student who really enjoys these laboratory exercises and excels in them frequently demonstrates the motivation and skills to conduct independent research. Many undergraduate students are not fully aware of the numerous opportunities to enroll in independent research courses with UT faculty. Such a favorable combination of circumstances often leads to a decision to pursue a graduate career in cellular and molecular biology.

Laboratory Partners:

You will be working in groups of two for most laboratory exercises. You and your partner will share a given microscope and digital camera and are responsible for its efficient operation during the semester's duration.

Participation:

You are expected to participate in ALL laboratory exercises, to take all quizzes and to turn in all laboratory reports. Participation in the laboratory is a necessary prerequisite for submitting a report. Since we will meet only once each week, it is vital that your

class absences be kept to a minimum. *Under no circumstances* will you be allowed to miss more than 3 laboratory periods.

Breaks:

It has become a BIO 323L tradition to have a brief coffee/tea break during the laboratory period (around 3 PM in PAI 2.26), lasting about 25 minutes. Dr. Brown will provide the coffee and tea, and the students sign up to bring snacks. Please sign up the first class meeting on the sheet posted in the laboratory. This is a voluntary effort.

Grading System:

Quizzes (20% Course Grade) Five short announced quizzes covering the experiments of the previous and present weeks will be given. They will consist of a few short written questions and a brief practical section. No make ups are allowed, and one quiz grade may be dropped. In addition, you will be graded on your peer review presentation, and this grade will replace the lowest quiz grade.

Laboratory Reports (80% Course Grade) Nine laboratory reports will be required. You will be allowed to drop the lowest laboratory report grades, and an average of your highest eight laboratory reports will constitute this part of the course. All laboratory reports must be completed and turned in on time. *Failure to turn in a report will result in a zero which will not be dropped when determining the average score for this part of the course.* Please note that all lab reports are due *at the beginning of the class period of the week following the exercise.* If you turn in your report late, *one letter grade* will be deducted for each day the report is late. Please abide by these rules. They will be strictly enforced.

Written Laboratory Report Format

All reports will be in the format style of a typical research article manuscript that would appear in *The Journal of Cell Biology*, for example. A journal article manuscript is very different from an article in a book, a textbook, or this lab manual, so be sure to look at the format from cell biology journals. The reports are to be printed double-spaced with a legible font style and size, (keep the font size and style the same throughout the paper). Use a high quality laser printer. Word processing is required so that you can effectively edit your work before submission. If you do not have or do not know how to use a word processing computer, please ask someone in the class who has experience. This will save you much time. The University has many centers for word processing, and you can have your reports printed from many commercial establishments. *The laboratory report is to be stapled in the left hand corner.* Do not use cover binders.

Title Page:

Include your name, the date due, the title of the experiment, and the report number. Do not add any additional information.

Abstract:

Supply on a separate page (single or double spaced) a concise summary (225 words or less). As a summary, it should be written as a single paragraph and include highlighted points of information from each section of the report.

Introduction:

Limit this section to 5-6 double spaced typed pages. Explain the background of the experiment. Describe the objectives and provide the necessary theory to understand and interpret the results and observations. Include drawings, photos, sketches, or tables. It is imperative to correctly cite the source of this information (use the citation format found in the *Journal of Cell Biology*). You also should cite any diagrams, drawings, or other materials which are not your own in the figure legend. The Internet is a good source of many photos all of which should be properly cited. Should you reproduce or alter slightly an illustration which did not originate from you, cite the source of the drawing by adding "modified from" and then give the source. Write this section in your own words without paraphrasing the source material. Feel free to use laboratory manuals (including the lab manual for this course), lab handouts, and library reference materials to furnish key information for this section.

Materials and Methods

Describe in your own words the procedures and methods undertaken in the experiment. Be as specific as possible and use diagrams and drawings or sketches if helpful. Include model numbers, settings, and equipment specifications. Do not use an abbreviated listed, format of methodology. Do not copy directly from the lab manual.

Results:

Include observations and raw data collections in this section presented *in paragraph form*. Questions posed in the procedures section of the manual for each laboratory that asks "WHAT" or "HOW MUCH" should be discussed in this section. The text of the results should then refer to all of the original photomicrographs, tables, graphs, and other illustrations. If necessary, use tables, graphs, or other formats to present your data. If the presented data originates from materials other than your own, you must cite the source. Accurately label all graphs, tables, figures, and drawings. For photomicrographs, list correct magnifications along with key labels of pertinent structures and a short legend of explanation describing the material (about 1-3 sentences).

Discussion:

In this section you will interpret the results using your own words. The results section will be facts, but the discussion section should be theory. Relate your observations to known principles. Explain deviations or unexpected results. Any strange or curious discovery should be accurately and completely explained and justified in this section. Questions posed in the procedures section of the manual for each laboratory that ask "WHY" or "HOW" should be discussed in this section. Do not use a question, answer format; use a discussion paragraph format (reference to the exact question in the laboratory manual does not have to be made). This section should include more information than just answers to the questions posed in the procedures. Use appropriate literature citations or references.

BIOLOGY 323L Tuesday Class
GRADING FORM FOR WRITTEN REPORTS

Name: _____

Lab Report # _____

General

/ 5 proper format

/ 5 grammar and spelling

Sections

/ 5 Abstract-

summarizes entire report
concise

/20 Introduction-

purpose clearly stated
original work
all principles covered
pertinent diagrams and formulae

/15 Materials and Methods-

in paragraph form
include additions or deletions

/20 Results-

all raw data (photos, drawings, tables)
magnifications and labels given
paragraph form

/25 Discussion-

discuss and analyze all raw data
tie in theory and principles
discuss any problems or successes

/ 5 References-

ideas and concepts sufficiently cited
number of references
citations in proper format

/100 Total points

Comments: Late papers will be deducted one letter grade for each day the report is late. Reports are to be turned in at the beginning of class on the date they are due.

Final Course Grades:

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
100-93	92-90	89-87	86-83	82-80	79-77	76-73	72-70	69-67	66-63	62-60	59 and Below

Laboratory Schedule

BIO 323L: Laboratory Methods in Cell Biology

2016 Fall Semester

Unique Number 48560

1-6 PM on **Tuesday**, PAI 1.32

<u>Week</u>	<u>Rep ort due</u>	<u>Section</u>		<u>Class Topics</u>
August 30, 2016				Brief class meeting. Adds and drops should be completed. Goals and objectives of course. Tour of lab. Wednesday August 31 is the last day to add/drop. You cannot change sections
September 6		I		Rules and familiarization with the microscope. Introduction to basic optics part I: properties of light through the objective lens.
September 13	1	II		Introduction to basic optics part II: resolution and diffraction. ***QUIZ 1***
September 20	2	III		Darkfield microscopy
September 27				No Class- RMB out of Town
October 4	3	IV		Phase contrast microscopy ***QUIZ 2***
October 11	4	V		Polarization microscopy
October 18	5	VI		Fluorescence microscopy ***QUIZ 3***
October 25	6	VII		Cell Reconstruction ***QUIZ 4***

November 1	7	VIII	Electron microscopy lab #1: Demonstration of TEM and negative staining. Sign up for time on TEM. ***QUIZ 5*** Journal Assignment introduction
November 8	8	IX	Electron microscopy lab #2: Hands-on observations of negatively stained material. Come at appointed time. Peer Reviews Materials Due to RMB
November 15	9	IXb	Electron microscopy lab #2: Hands-on observations of negatively stained material. Come at appointed time.
November 22			Peer Reviews Session: A. RMB talk, discussion (<i>Flag Requirement</i>) B. Students' presentations and peer review discussions (<i>Flag Requirement</i>)
November 24			No class Thanksgiving Break
November 29			Last class day. Student evaluations. Lab cleanup and microscope checkout. Class Picnic at Dr. Brown's home (a Bio 323L tradition!)

Special Notes:

- 1) All reports are due the week following the laboratory.
- 2) Please bring a digital camera to take pictures through the oculars
- 3) **Check out our BIO 323L website: <http://www.botany.utexas.edu/class/default.htm>**
username: student323
password: microscope
- 4) **You are expected to attend the first day of class on August 30, 2016.** Desk preference will be given to students who attend this first day.

Laboratory Schedule Rules and Laboratory Precautions

1. Know the location of the FIRST AID KIT and the EMERGENCY SHOWER in the Dr. Brown's research lab (PAI 1.32).
 2. Disposal of chemicals and lab materials in the proper place.
 - a. use the GLASS bucket for all glass slides and glass objects
 - b. dispose of organic wastes in the waster bottles provided
 3. Use caution when handling strong acids or bases.
 4. Avoid damaging your eyes with:
 - a. ultraviolet light
 - b. toxic chemicals
 - c. laser beams
 5. Avoid burns from the hot surfaces of the microscope illuminators.
 6. Notify the instructor immediately of chemicals spills, cuts from glass or other objects, or any other type of injury.
 7. NO FOOD is permitted in the laboratory.
 8. Use only ROSS CERTIFIED LENS TISSUE to clean optical parts.
 9. Use compressed air to remove dust from eye pieces.
 10. Use care in handling the Pixera Digital Cameras
 11. Do not go online unless instructed to do so. You may send your photos online to your website; however, a safe copy should be retained on the computer.
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Other important notices

Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259, <http://www.utexas.edu/diversity/ddce/ssd/>

Academic dishonesty. Please review the UT Honor Code (or statement of ethics) which includes an explanation or example of what constitutes plagiarism (Link to University Honor Code: <http://registrar.utexas.edu/catalogs/gi09-10/ch01/index.html>)

Accommodations for religious holidays. By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Emergency evacuation from the Office of Campus Safety and Security, 512-471-5767, <http://www.utexas.edu/safety/> :

Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.

Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.

Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.

In the event of an evacuation, follow the instruction of faculty or class instructors.

Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.

Behavior Concerns Advice Line (BCAL): 512-232-5050

Link to information regarding emergency evacuation routes and emergency procedures can be found at: www.utexas.edu/emergency