

Biology/Biochemistry 4580/5580
Molecular Biology and Biotechnology Laboratory
Fall 2025

Course Materials and Supplies

You will need access to a computer with an Internet connection to access course web site materials while participating in the lab. If one is unavailable for you then you can check one out from Sage Hall <https://it.unt.edu/laptop-checkout>.

Ground rules:

- There are no make-up labs! Attendance, taken at the start of class, is expected for all classes.
- Unexcused absences or tardiness will affect your participation grade, and your grade will be docked for the day.
- You must be on time and stay for the entire lab to get the participation grade for that day! Being late will dock you 5 points for being 10 minutes late from the start of the lab.
- **All absences (University related, Illness, Military, Religious, Pregnancy and Parenting (Title IX))** must be submitted to the Dean of Students within a **week of an absence from a lab**. Once they are verified, they will email us to confirm. This should be done within a week of the missed lab and the TA notified.
- **Participation:** This grade includes your participation and completion of exercises for the class. This grade is not an attendance grade.
- No extra credit will be given!!!!!!
- If you have taken this lab in a previous semester, you may not submit assignments (yours or someone else's assignment—problem sets, reports etc...) from a previous semester as the current semester's assignment. It will be a grade of "0" or an "F" if you are caught doing so. Please see under title "Penalties for Academic Misconduct" in this manual.
- TA's will get all graded assignments returned to students within 7 days of assignment due date.
- TA's will provide at a minimum 3 hours of open office hours per week.

This is a very heavy based technique class → If you are not present then:

- You are missing out on techniques and materials covered.
- You are missing out on skills acquired through learning.
- Your group's inability to get data will also jeopardize your grade.

Directly from the DOS Office: <https://deanofstudents.unt.edu/resources>

... your professors have no obligation to make temporary adjustments [for illness, death in the family, etc.]. If they decline to allow adjustments you may need to withdraw from the course, take an Incomplete, or repeat the class in the future.

Course Safety Statements

Students are urged to use proper safety procedures and guidelines. While working in laboratory sessions, students are expected and required to identify and properly use safety guidelines in all activities requiring lifting, climbing, walking on slippery surfaces, using equipment and tools, handling chemical solutions and hot and cold products. Students should be aware that the University of North Texas is not liable for injuries incurred while students are participating in class activities. All students are encouraged to secure adequate insurance coverage in the event of accidental injury. Students who do not have insurance coverage should consider obtaining Student Health Insurance for this insurance program. Brochures for this insurance are available in the UNT Health and Wellness Center on campus.

Students who are injured during class activities may seek medical attention at the UNT Health and Wellness Center at rates that are reduced compared to other medical facilities. If you have an insurance plan other than Student Health Insurance at UNT, please be sure that your plan covers treatment at this facility. If you choose not to go to the UNT Health and Wellness Center, you may be transported to an emergency room at a local hospital. You are responsible for all expenses incurred.

Your final laboratory grade will be determined as follows: 500 points total

Please make sure that you calculate your grades according to the rubric below.

Canvas is not always accurate with the final grade determination.

% score	Max point score	Description
22%	120	Group assignment turn in* (30pts total for each 4 labs segments)
22%	120	Participation (not an attendance grade!!) --TA evaluates. (12 labs participation— 10 pts each)
33%	180	Group Dynamic Evaluation—your group members evaluate (Group assignments and in-class work within the group).
11%	60	Case study- Final exam**/Oral Comprehensive Make-up exam** (closed notebook—no outside resources allowed!). Exam will be on paper—no computer, internet, phone or smart watch will be allowed!
11%	60	Group presentation → F2F—not Zoom! Peer reviewed by classmates
100%	540	Total

*No do-over once graded!! Assignments must be turned when lab ends for the day.

Grade distribution:

% grade		Points
100-90	A	486 and above
89-80	B	432-485
79-70	C	378-431
69-60	D	324-377
Below 60	F	323 and below

***Student conduct in class: F2F 10 pts—total for the criteria listed below. There are 12 labs that are counted.**

- Student is on time on time for the lab→Within 5 minutes from the start of the lab and must stay for the entire lab. (3pt)
- Participates in Lab activity. If you leave early without permission from the TA—you will be docked participation points (3pts)
- Respond to questions or discussion to demonstrate understanding of the topic. (2pt)
- Volunteer relevant and interesting ideas during class discussion. (2pt)

Instructional Laboratory Supervisor contact info: Please use the below contact info and not the contact info through Canvas!!! All my canvas emails go to junk mail.

Dr. Arland Alberts (940-369-8683, aalberts@unt.edu, Life Science Building A #349 Suite D)

Important dates: A list of important dates and deadline information can be found on the UNT Registrar's webpage: <https://registrar.unt.edu/registration/fall-academic-calendar.html>

Group Assignments.

1. Assignments must be turned in as an original Microsoft Word document. All documents need to be turned in to Turnitin **AND** to the TA's email 10 minutes before the class ends. A late turn in will result in your assignment being docked as 10% late.
2. Assignments are a group effort with one student picked to attach the document into Turnitin and the TAs email.
3. **Late Assignments.** Will be penalized 10% points per day including weekends and holidays. An assignment is due ten minutes before the end of your class and say if your lab meets on Friday and your lab ends at 2:50PM, if you submit it between the 24hrs after lab ended then it is considered one day late. If you submit it Saturday 24hrs later it is now considered two days late etc... **You and your group have 2 days to turn in an assignment after its due date on the clock, after that it will not be accepted!**
4. **Assignments are a group effort.** Plagiarism and cheating rules still apply! If there is an indication that there is an issue, it will be thoroughly investigated. The rules will apply to all group members and all group members will be docked to a "0" grade and reported to the Dean of students. It is therefore prudent as a group to go over each aspect of your group document.
5. **Please designate one dependable person to turn in each assignment. If your group fails to turn it in, then the document will be considered late and all group members will be affected.**
6. You have 5 minutes after the lapse of the deadline for your assignment to notify the TA of **any issues relating to turning in of the assignment into Turnitin**—this does not pertain to issues with completing the assignment on time. After this time frame the assignment will be considered 1 day late and will follow rule#3 in this section.
7. Please make sure to submit the correct version and format of the assignment (**original Microsoft Word document--doc**). An incorrect version or incorrect format will not allow you to do a do-over of the assignment/exam after the deadline has passed. If the version turned in through Turnitin is different from the one submitted by email, then you will receive a "0" for that assignment even if you have an assignment that is time stamped. It is the responsibility of the student(s) to double check all assignments submitted!
8. If any assignments are turned in as a PDF or in another form that is not a Word document into Turnitin and to the TA's email, it will automatically be given a grade of "0".
9. If the TA suspects cheating and an investigation is opened and confirms it, then the student(s) will be reported to the Dean of Students and to the Academic Integrity office. All reports of plagiarism and cheating will be reported to the Dean. This is non-negotiable!
10. There are no "do overs" for any assignments.

Exam.

1. **All exams** will be F2F and not through Zoom or an online site.
2. Final Exam will be given at the start of the class and will only be administered for 2hrs only. If you are late you can take the exam, but you will not be given additional time. In other words, if you

come in an hour late from the start of any exam, then you will only have 60 minutes to complete the exam.

3. Exams are closed book and no class notes or outside sources can be used when exams are administered. If the TA suspects cheating and an investigation is opened and confirms it, then the student(s) will be reported to the Dean of Students and to the Academic Integrity office.
4. All reports of plagiarism and cheating will be reported to the Dean. This is non-negotiable!
5. For those students who miss the exam, you will need to provide documentation for the reason missed **within a week of the exam**. Only accepted **Absences (University related, Military, Religious, Pregnancy and Parenting (Title IX))**—will have the opportunity to take an **Oral Comprehensive make-up exam (60pts) for a total of 2hrs only** and will be administered one on one basis with the TA &/or Lab supervisor in attendance on the designated week(s).
6. If you have an approved Dean's note for the exam) absence, that the Instructional Laboratory Supervisor has approved, then you can take the oral comprehensive make-up exam. You cannot take both exams and think that one will replace the lower grade exam.
7. For a missed exam, please submit an approved excused absence documentation to the Dean of students **within the week of the missed exam**. The make-up comprehensive exam will be oral and not written. The oral comprehensive exam will be closed book. The exam will need to be taken during the scheduled week, please see syllabus. Only you and the TA/Lab supervisor will be present.
8. If you come in for an exam late and students have already completed and left the exam, then you will not have a chance to sit for the exam.
9. Once you are scheduled for the **Oral comprehensive make-up exam**, you only get one chance to reschedule in case of emergencies—documentation will need to be provided.
10. There are no “do overs” for the Final exam.
11. There are no “do overs” of the Oral comprehensive make-up exam.

Lab Rules

No food, drink or whining is allowed in the teaching laboratory.

Students are responsible for leaving their workstations clean and orderly for the next lab section. A student may leave the lab after completing all work and/or checking out with his/her lab instructor.

Policy on Academic Misconduct

No cheating will be tolerated. Anyone caught cheating (all forms) will receive a grade of zero and the matter will be turned over to the Dean of Students.

Collaboration and Plagiarism

During the semester you will be generating data as a group, but the actual production of laboratory notebooks or any other written work is to be an individual effort and not a collaboration with others. We have had instances in the past in which identical laboratory notebooks were submitted. Students attempting this will have the grade divided between them and be reported to the Dean of Students. You will risk failing this course and generating a report of academic dishonesty on your student record.

Penalties for Academic Misconduct: Will be reported to the Dean of Students

1. First offense: A “0” will be recorded as the score for that activity AND the final course grade reduced by one complete grade
2. Second offense” Assignment of F (Fail) for the final course grade

3. For grievous infractions such as, but not limited to, a systematic or collaborative event: An assignment of F (Fail) for the final course grade may be issued in the case of a first offense.
4. An example of a grievous 1st offense that will result in an “F” in the course would be turning in collections that you have stolen, borrowed, or otherwise not personally collected and try to pass them off as your work

The following is taken from the Policies Chapter under “Code of Student Conduct and Discipline.” UNT Undergraduate Catalog. The university is creating a database, so all incidents of plagiarism and cheating since April 2017 are now required to be reported to the university.

Academic dishonesty — Cheating

The term ‘cheating’ includes, but is not limited to:

- (a) Use of any unauthorized assistance in taking quizzes, tests, or examinations;
- (b) Dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying other assignments;
- (c) The acquisition, without permission, of tests or other academic material belonging to a faculty or staff member of the university;
- (d) Dual submission of a paper or project, or resubmission of a paper or project to a different class or a class taken in a previous semester(s) without express permission from the instructor(s); or
- (e) Any other act designed to give a student an unfair advantage.

Academic dishonesty — Plagiarism

The term ‘plagiarism’ includes, but is not limited to:

- (a) The knowing or negligent use by paraphrase or direct quotation of the published or unpublished work of another person without full and clear acknowledgment; and
- (b) The knowing or negligent unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

Plagiarism and cheating refer to the use of unauthorized books, notes, or otherwise securing help in a test: copying tests, assignments, reports, or term papers; representing the work of another as one’s own; collaborating, without authority, with another student during an examination or in preparing academic work: or otherwise practicing scholastic dishonesty.

“Academic dishonesty matters may first be considered by the faculty members who may assign penalties such as failing, reduction or changing a grade in a test, course, assignments, or other academic work, denial of a degree and/or performing additional academic work not required of other students in the course. If the student does not accept the decision of the faculty member, he/she may have his/her case heard by the academic department chairperson or head for review of his/her case. If the student does not accept the decision of the academic department, he/she may then follow the normal appeal procedures listed under Disciplinary Procedures.”

Plagiarism is the borrowing of material and trying to pass it as one’s own. It is important to understand what constitutes plagiarism:

- Quoting without citing references.
- Directly copying and pasting another author’s work and crediting their ideas as one’s own.
- Improper paraphrasing. This can range from substituting words in a sentence and/or reshuffling the sentence. In other words, the sentence is still borrowed.

An example taken from Butte College:

“Original:

To study the challenge of increasing the food supply, reducing pollution, and encouraging economic growth, geographers must ask where and why a region's population is distributed as it is. Therefore, our study of human geography begins with a study of population (Rubenstein 37).

Inadequately paraphrased (word substitution only) and uncited:

To increase food supplies, ensure cleaner air and water, and promote a strong economy, researchers must understand where in a region people choose to live and why. So human geography researchers start by studying populations.

This writer reworded a two-sentence quote. That makes it his, right? Wrong. Word substitution does not make a sentence, much less an idea, yours. Even if it were attributed to the author, this rewording is not enough; paraphrasing requires that you change the sentence structure as well as the words. Either quote the passage directly, or *substantially* change the original by incorporating the *idea* the sentences represent into your own claim.

Adequately, substantially paraphrased and cited:

As Rubenstein points out, distribution studies like the ones mentioned above are at the heart of human geography; they are an essential first step in planning and controlling development (37).”

- Relying heavily on cited quotes in your document without any original idea that is stated in your own words to tie the information together. Essentially you are still borrowing.
- Dual submission of a paper or project, or resubmission of a paper or project to a different class or a class taken in a previous semester(s) without express permission from the instructor.

How to prevent plagiarism from happening:

- Each journal article you read, use your note pad to make bulleted points on what the author has written, but phrase it in your own words unless you intend to quote.
- Make sure for every article you read; you record the source on your notepad along the bulleted information.
- Read all your notes and organize them in terms of similarity. This will help you structure your paragraphs.
- Number each paragraph in the order you want them to go.
- Rewrite your bulleted points into sentences.
- Reference each sentence unless you are concluding a thought process. If so, then justify your conclusion and at this point you might also want to reference an article that will lead to credibility of your conclusion.

Policy on Disability Accommodations

The Department of Biological Sciences, in cooperation with the Office of Disability Accommodations, complies with Section 504 the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. Please present your written request before the 12th class day so that necessary arrangements may be made.

“The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your

specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the Office of Disability Accommodation website at <http://www.unt.edu/oda>. You may also contact them by phone at 940.565.4323.

Biology Laboratory Procedures and Safety Rules

Laboratory safety is the first and foremost concern in any laboratory. The following regulations need to be followed without exception.

IMPORTANT LABORATORY PROCEDURES

1. Make sure you know how to properly dispose of any chemicals used in laboratory.
2. Make sure all chemical containers are closed tightly after use.
3. Keep the laboratory clean and organized.
4. Be familiar with experimental procedures you will be performing before coming to the laboratory.

SAFETY RULES

1. **DO NOT EAT OR DRINK IN THE LABORATORY!** Smoking is prohibited in all UNT buildings.
2. Broken glassware must be disposed of in the glass disposal receptacle located in the laboratory. This box is for glass only.
3. If you or another student is cut or injured in any way during the laboratory, inform the instructor immediately.
4. Bare feet are not permitted in laboratory. Wear shoes as protection against broken glass or spillage. It is encouraged to wear long pants and long-sleeved tops, or purchase of a lab coat.
5. Know where to find emergency equipment such as the eyewash, fire extinguisher, and first aid kit.
6. Report any conditions that appear hazardous to the instructor.
7. Do not bring children to the laboratory. Unaccompanied children are not permitted on campus.
8. Pay attention to warnings in the laboratory manual or warnings given by instructors during the laboratory.
9. Turn instruments off when the laboratory is over, unless you are instructed otherwise.
10. Always wash your hands after completing your laboratory work. Do not apply cosmetics during the laboratory.
11. Always think before you act.

Care of Equipment

You are expected to keep the laboratory and all equipment clean and orderly. A significant portion of your grade will be based on your performance in the laboratory, your ability to operate the instruments, and leaving them in a clean and operable condition.

The following items are particularly important:

1. **Balances:** Must be left clean. Any residue spilled on the pan or in the chamber must be brushed out immediately and completely. Analytical balances cost approximately \$2000, and chemicals left in the chamber are corrosive.
2. **Centrifuges:** These instruments cost thousands of dollars.
 - a. Be sure tubes are balanced on each side of the rotor; an unbalanced rotor can cause considerable damage to the instrument.
 - b. Be sure the lid is closed and locked before accelerating the centrifuge.
 - c. Broken tubes are very dangerous.
 - d. Always wait until the centrifuge stops before opening the top. Never try to “brake” the centrifuge with your hand.
 - e. In case of spills, clean up immediately after the run is completed.
3. **Spectrophotometers:** When measurements are performed, check for spilled liquid on the floor of the sample compartment before and after use. Wipe off any spilled liquid immediately to prevent evaporation and subsequent corrosion of the compartment.
4. **Sinks** are only for disposal of liquids and washing of glassware. Never dispose of solids, filter paper, precipitates, glass, etc. in the sink. When in doubt about the disposal of liquids or solids, always ask the instructor. Special containers will be provided for disposal of liquids and solids that might pollute disposal systems (i.e., phenolic compounds).
5. **Water baths:** Do not leave wire test tube racks in water baths as this leads to rust and corrosion.
6. **Micropipettors:** Each micropipettor costs over \$200. They are precision instruments. Please treat them as such.
7. **Incubators/Refrigerators:** Please keep these clean. Remove and dispose of any items that are growing organisms you don't want (i.e. mold).
8. **The laboratory must be left clean, and all equipment must be left clean and operable.**

Operating Micropipettors

Recommended Volume Range:

- **Model P-20** is adjustable from 0-20 μl in 0.1 μl increments.
 - Recommend volume range is 2.0 –20.0 μl .
- **Model P-200** is adjustable from 0-200 μl in 1.0 μl increments.
 - Recommend volume range is 20 –200 μl .
- **Model P-1000** is adjustable from 0-1000 μl in 10 μl increments.
 - Recommend volume range is 200 –1000 μl .

Operation:

1. Set desired volume by holding the pipetman body in one hand and turning the volume adjustment knob until the correct volume shows on the indicator. **DO NOT** over or under dial the adjustment knob beyond the range of the pipetman.
2. Attach a new disposable tip to the shaft of the pipette. Press on firmly with a slight twisting motion to insure a positive airtight seal.
3. Depress the plunger to the **First Positive Stop**. This part of the stroke is the calibrated volume shown on the volume indicator.
4. Holding the pipetman vertically, immerse the disposable tip into the sample liquid. Do not immerse more than approximately $\frac{1}{4}$ of the disposable tip into the sample liquid. Do not handle the tips with your hand. Avoid touching the mouth or sides of the sample container with the tip/pipetman.
5. Allow the plunger to return **SLOWLY** to the **UP** position. Never permit it to snap up.
6. Wait one to two seconds to ensure that the full volume of sample is drawn into the tip. Be sure that there are no air bubbles in the tip.
7. Withdraw the tip from the sample liquid.
8. Dispense sample, place the open tip end against the sidewall of the receiving vessel and depress the plunger slowly to the **First Stop**. Wait one to two seconds for the volume to dispense. Then depress the plunger to the **Second Stop**, expelling any residual liquid in the tip.
9. With the plunger still fully depressed, withdraw the pipetman from the vessel carefully with the tip opening sliding along the wall of the vessel.
10. Let the plunger slowly return to the up position.

BIOL/BIOC 4580/5580: MOLECULAR BIOLOGY AND BIOTECHNOLOGY LABORATORY

Schedule is subject to change due to unforeseen events. The student is responsible for keeping up with the schedule. ***All sessions will be conducted as F2F lab.**

Week of	Schedule of activity *Participation is counted!
Wk1* 8/18	Orientation Group Assignment #1: Summary of article ~2 pages. pClone: Synthetic Biology Tool Makes Promoter Research Accessible to Beginning Biology Students Background
Wk2* 8/25	Background Group Assignment #2: Design dsDNA mutant Promoter
Wk3* 9/1	Make dsDNA Promoters from ssDNA Oligonucleotides→P5, P5-33A, and student mutant promoter
Wk4* 9/8	Make media for next week Golden Gate Assembly (GGA) Cloning of Promoters
Wk5* 9/15	Transform ligations into <i>E.coli</i> and spread cells onto media plates
Wk6* 9/22	Count, photograph, and categorize colonies from transformation Measure Reporter Protein production in <i>E.coli</i> cells using ImageJ Colony PCR and run on gel Inoculate to grow p5, P5-33A, and student mutant promoter Group Assignment #3: Promoter results
Wk7* 9/29	Plasmid extraction pClone promoter verification--PCR Restriction Digest Problem set Individual Extra credit —turn in before class ends
Wk8* 10/6	Run gel Aliquot for sequencing
Wk9* 10/13	Sequence analysis using BioEdit or other sequence analysis program Group Assignment #4: Aligned sequencing results
Wk10* 10/20	Work in class on mock grant writing group presentation. Turn in through Turnitin at the end of the class for feedback from the TA.
Wk11* 10/27	Work in class on mock grant writing group presentation. Turn in through Turnitin at the end of the class for feedback from the TA.
Wk12* 11/3	Group Face-2-Face Presentation (must be present in class to present)
Wk13 11/10	Final Exam. F2F- 2hrs only!
Wk14 11/17	Oral make-up Exam via appointment with the TA- F2F. 2hrs only! (comprehensive)
Wk15 11/24	Labs will not meet this week.
Wk16 12/1	TBD

Academic Support & Student Services

Student Support Services

Mental Health

UNT provides mental health resources to students to help ensure there are numerous outlets to turn to that wholeheartedly care for and are there for students in need, regardless of the nature of an issue or its severity. Listed below are several resources on campus that can support your academic success and mental well-being:

- [Student Health and Wellness Center](https://studentaffairs.unt.edu/student-health-and-wellness-center) (<https://studentaffairs.unt.edu/student-health-and-wellness-center>)
- [Counseling and Testing Services](https://studentaffairs.unt.edu/counseling-and-testing-services) (<https://studentaffairs.unt.edu/counseling-and-testing-services>)
- [UNT Care Team](https://studentaffairs.unt.edu/care) (<https://studentaffairs.unt.edu/care>)
- [UNT Psychiatric Services](https://studentaffairs.unt.edu/student-health-and-wellness-center/services/psychiatry) (<https://studentaffairs.unt.edu/student-health-and-wellness-center/services/psychiatry>)
- [Individual Counseling](https://studentaffairs.unt.edu/counseling-and-testing-services/services/individual-counseling) (<https://studentaffairs.unt.edu/counseling-and-testing-services/services/individual-counseling>)

Additional Student Support Services

- [Registrar](https://registrar.unt.edu/registration) (<https://registrar.unt.edu/registration>)
- [Financial Aid](https://financialaid.unt.edu/) (<https://financialaid.unt.edu/>)
- [Student Legal Services](https://studentaffairs.unt.edu/student-legal-services) (<https://studentaffairs.unt.edu/student-legal-services>)
- [Career Center](https://studentaffairs.unt.edu/career-center) (<https://studentaffairs.unt.edu/career-center>)
- [Multicultural Center](https://edo.unt.edu/multicultural-center) (<https://edo.unt.edu/multicultural-center>)
- [Counseling and Testing Services](https://studentaffairs.unt.edu/counseling-and-testing-services) (<https://studentaffairs.unt.edu/counseling-and-testing-services>)
- [Pride Alliance](https://edo.unt.edu/pridealliance) (<https://edo.unt.edu/pridealliance>)
- [UNT Food Pantry](https://deanofstudents.unt.edu/resources/food-pantry) (<https://deanofstudents.unt.edu/resources/food-pantry>)

Academic Support Services

- [Academic Resource Center](https://clear.unt.edu/canvas/student-resources) (<https://clear.unt.edu/canvas/student-resources>)
- [Academic Success Center](https://success.unt.edu/asc) (<https://success.unt.edu/asc>)
- [UNT Libraries](https://library.unt.edu/) (<https://library.unt.edu/>)
- [Writing Lab](http://writingcenter.unt.edu/) (<http://writingcenter.unt.edu/>)