



# MLAB 2221.211 – Molecular Diagnostics (HYBRID)

Course Syllabus: Summer 2022

*“Northeast Texas Community College exists to provide personal, dynamic learning experiences empowering students to succeed.”*

**Instructor: Gaylon Barrett and Chantel Sokol**

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Office Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Online
	9:00-noon	1:00-4:30	By appt	By appt	By appt	Available
	1:00-4:30					

***This syllabus is an agreement between the instructor and the student.***

*Information relative to the delivery of the content contained in this syllabus is subject to change. Should that happen, the student will be notified by the instructor.*

**Course Description:** 2 credit hours.

Lecture/Lab/Clinical: Three hours of online lecture and three hours of lab each week (Tues 0930-1230). A comprehensive overview of the fundamental principles of clinical molecular diagnostics and explores the use of molecular techniques in the diagnosis of disease.

**Prerequisite(s):** Admission to MLT program or Department approval

### Student Learning Outcomes:

1. Describe the basic structure of DNA and RNA
2. Describe the basic process of DNA replication
3. Perform DNA extraction on a clinical specimen
4. Demonstrate an understanding of basic molecular diagnostic techniques
5. Demonstrate an understanding of electrophoresis in the separation of DNA fragments
6. Apply molecular diagnostic techniques to the identification and diagnosis of diseases

### Evaluation/Grading Policy:

A	≥90%
B	80-89%
C	70-79%
D	60-69%
F	<60%

Lecture grade: 4 exams 20% each  
Quiz Average 20%

Laboratory grade: Lab participation 50%  
Homework average 50%

Final grade: 75% of lecture grade and 25% of laboratory grade

**Grades will be posted on Blackboard by the Monday following due date.**

**A minimum grade of “C” is required in both the lecture and laboratory components of all Medical Laboratory Technician courses. Failure to meet the minimum passing score in each area will result in a “D” for the course and dismissal from the program.**

**Required Instructional Materials:** Laptop, PowerPoints, lectures and additional resource material on Blackboard

**Optional Instructional Materials:** Buckingham, L. (2019). *Molecular diagnostics: Fundamentals, methods, and clinical applications*. F.A. Davis Company.

**Publisher:** F.A. Davis Company

**ISBN Number:** 9780803699540  
9780803668294

### **Required Computer Literacy Skills:**

#### Computer

Most Windows or Mac desktop and laptop computers work well for online classes.

Chromebooks use the Chrome operating system which is not a supported operating system for Blackboard. Some areas of Blackboard require Java on your computer, and Chromebooks do not support the use of Java. If you use a Chromebook, please be sure you also have access to a Mac computer or Windows computer so you can fully participate in your Blackboard class. Some things will not work on a Chromebook.

Please do not ONLY rely on a tablet, including an iPad, or a smartphone to use Blackboard. Not all features will work on tablets and smartphones. You may need access to a full computer to be able to do everything in your Blackboard class.

You will need to save documents and upload them to Blackboard. The NTCC Student Support link in your Blackboard class can direct you to help if needed for how to save and upload documents.

#### Internet Access

While Bb can be accessed with dial-up online service, best results will be obtained when using a broadband Internet service.

#### Intermediate Internet Skills

You should be familiar with how the Internet works including following links and searching for information.

#### Intermediate Word Processing Skills

You should be familiar with how to enter data (text) on a word processing document, format text, and save documents.

#### Java

Make sure your computer is running the current version of java. It is a free download at [www.java.com](http://www.java.com).

#### Internet Browser

Supported browsers for use with Blackboard include Firefox, Google Chrome, Internet Explorer, and Safari. If you experience any problems in Blackboard we recommend you login to the portal and Blackboard from another browser before seeking assistance from NTCC Technical support.

## **Course Structure and Overview:**

Lecture 1: Introduction to Molecular Diagnostics

Lecture 2: Specimen Types and Uses

Lecture 3: Nucleic Acid Isolation

Lecture 4: Polymerase Chain Reaction (PCR)

Lecture 5: Resolution and Detection of Nucleic Acids by Electrophoresis

Lecture 6: Analysis of Nucleic Acids by Southern Blotting

Lecture 7: Detection and Identification of Microorganisms

Lecture 8: Polymorphisms and Mutations

This is a Hybrid class which means lab meets once a week and all other instruction is done online via the learning management system BLACKBOARD. In person meetings will be reserved for homework review, labs, and exams. Students are expected to complete all readings of the lecture materials, review PowerPoints, and complete the online activities. You will see that the course is divided into 4 weeks in the Blackboard portion. Each week you will be expected to complete certain online assignments for the chapters found in that week's folder. This course requires daily computer and internet access. You should expect to spend no less than 9 hours a week in this course. Pay close attention to deadlines for all assignments. Technical difficulties are no excuse for late assignments. A due date assignment schedule is posted in the START HERE folder in Blackboard the entire semester! Please check it weekly so that you know what is due and do not miss anything.

**Quizzes:** Taken on-line, multiple-choice questions over topics covered in the lecture readings and PowerPoint. 8 quizzes averaged together for 20% of lecture grade; grades reflected immediately in Blackboard. First attempt is recorded for grade, but retake quizzes multiple times to study for exams.

**Homework:** MediaLab assignments. Students will be given a MediaLab user name and password. They will complete the learning activity and assessment on MediaLab and submit their certificate of completion on Blackboard. There will also be an additional quiz posted in Blackboard to complete after submitting certificate. 4 assignments and 4 quizzes averaged together for 50% of lab grade; if turned in Tuesday will be graded by Wednesday

**Exams:** Multiple choice questions from quizzes and homework taken on laptop; each is 20% of Lecture grade; grade reflected immediately in Blackboard

**Lab Worksheets:** completed in-class. 4 labs averaged together for 50% of lab grade; grade posted on Wednesday following lab.

**Communications:** EMAIL: E-mail preferred. E-mails will be responded to within 24 hours during the work week (Monday – Thursday 8am-6pm and Friday 8-noon). Please check your NTCC email EVERYDAY. Email is the official form of communication used here at NTCC.

TEXT MESSAGE NOTIFICATIONS: You are required in this course to sign up for the text message notifications via Remind. I will use Remind to get information out to students quickly. This will enable you to receive important class announcements and reminders from me via text message so that you will not miss out on any assignment changes or important updates. To be added to the Remind group text @4h287gf to 81010. Please continue to check your NTCC email daily.

ANNOUNCEMENTS: These can be found in Blackboard under the course link on your Bb homepage. Please make sure you are reading any announcements thoroughly when they are posted there.

**Institutional/Course Policy:****Classroom Expectations:**

1. Attend all labs, be on time, and remain in class for the entire period.  
*If students are habitually late, the classroom door will be locked at the start of class.*  
If you must leave early, please inform the instructor before class begins.
2. Be prepared to take notes and participate in lab.
3. Be respectful of your classmates and instructors.
4. **Turn off cell phones or set to vibrate.**

**Attendance and Absences:** You are expected to attend ALL scheduled labs and take the exams as scheduled. You will be held responsible for all information covered in lab. *If you will be absent, inform the instructor by phone or email at least 15 minutes BEFORE class begins. Absences will be counted as unexcused if the instructor is not informed in a timely manner.* **This class only meets in person 5 times! More than ONE unexcused absence will result in the student being dropped from the course. Two unexcused late class attendance equals one unexcused absence.**

**Makeup Policy:** Late work will be accepted for quizzes and homework with a 10% late penalty. Assignments will be available on Blackboard each Tuesday and due by the following Tuesday at 9:30am. Late work will be accepted until Thursday at noon. After that date and time, a grade of zero will be entered for any work not completed. The student is responsible for requesting a makeup when they are unable to attend a regularly scheduled examination. Makeup exams and labs will be scheduled only in the event of an EXCUSED absence. Due to the nature of the labs performed this semester, replication of the lab for makeup is not feasible. In the event a lab must be made up, an acceptable independent activity will be assigned. All makeup exams will be on the Monday following the absence during office hours. If the test or lab is not made-up, the student will receive a zero for that exam or lab.

**NTCC Academic Honesty/Ethics Statement:**

NTCC upholds the highest standards of academic integrity. The college expects all students to engage in their academic pursuits in an honest manner that is beyond reproach using their intellect and resources designated as allowable by the course instructor. Students are responsible for addressing questions about allowable resources with the course instructor. Academic dishonesty such as cheating, plagiarism, and collusion is unacceptable and may result in disciplinary action. This course will follow the NTCC Academic Honesty and Academic Ethics policies stated in the Student Handbook. Refer to the student handbook for more information on these subjects.

**ADA Statement:**

It is the policy of NTCC to provide reasonable accommodations for qualified individuals who are students with disabilities. This College will adhere to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to request accommodations. An appointment can be made with the Academic Advisor/Coordinator of Special Populations located in Student Services and can be reached at 903-434-8264. For more information and to obtain a copy of the Request for Accommodations, please refer to the special populations page on the NTCC website.

**Family Educational Rights and Privacy Act (FERPA):**

The Family Educational Rights and Privacy Act (FERPA) is a federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program

of the U.S. Department of Education. FERPA gives parents certain rights with respect to their children's educational records. These rights transfer to the student when he or she attends a school beyond the high school level. Students to whom the rights have transferred are considered "eligible students." In essence, a parent has no legal right to obtain information concerning the child's college records without the written consent of the student. In compliance with FERPA, information classified as "directory information" may be released to the general public without the written consent of the student unless the student makes a request in writing. Directory information is defined as: the student's name, permanent address and/or local address, telephone listing, dates of attendance, most recent previous education institution attended, other information including major, field of study, degrees, awards received, and participation in officially recognized activities/sports.

**Schedule of Activities/Assignments (Tentative-Subject to change)**

Week	Date	On-Line	Lab
1	June 7 <sup>th</sup>	<ul style="list-style-type: none"> <li>Lectures 1&amp;2 on Blackboard</li> <li>Quizzes for Lectures 1&amp;2</li> <li>HW- Fundamentals of Molecular Diagnostics on MediaLab and quiz</li> </ul> Due 6/14	<ul style="list-style-type: none"> <li>Lab Orientation</li> <li>Molecular Diagnostics Virtual Lab, Quality Control (Lab 1)</li> </ul>
2	June 14 <sup>th</sup>	<ul style="list-style-type: none"> <li>Lectures 3&amp;4 on Blackboard</li> <li>Quizzes for Lectures 3&amp;4</li> <li>HW- Real Time PCR on MediaLab and quiz</li> </ul> Due 6/21	<ul style="list-style-type: none"> <li>Exam 1-in class on laptop</li> <li>DNA Extraction (Lab 2)</li> </ul>
3	June 21 <sup>st</sup>	<ul style="list-style-type: none"> <li>Lectures 5&amp;6 on Blackboard</li> <li>Quizzes for Lectures 5&amp;6</li> <li>HW- PCR Fundamentals on MediaLab) and quiz</li> </ul> Due 6/28	<ul style="list-style-type: none"> <li>Exam 2- in class on laptop</li> <li>DNA Separation by Electrophoresis (Lab 3)</li> </ul>
4	June 28 <sup>th</sup>	<ul style="list-style-type: none"> <li>Lectures 7&amp;8 on Blackboard</li> <li>Quizzes for Lectures 7&amp;8</li> <li>HW- Molecular Methods in Clinical Microbiology on MediaLab and quiz</li> </ul> Due 7/5	<ul style="list-style-type: none"> <li>Exam 3 – in class on laptop</li> <li>DNA Replication by PCR (Lab 4)</li> </ul>
5	July 5 <sup>th</sup>	<ul style="list-style-type: none"> <li>Final Exam at 0930</li> <li>In class room on Laptop</li> </ul>	

All of the listed week's work is due by Tuesday at 0930. I will accept late work with a 10% penalty until Thursday at noon following the due date. Make sure you understand due dates. Should you have questions you may email me at csokol@ntcc.edu. I highly recommend submitting all assignments early. Again, if there are any questions about the schedule please email me at csokol@ntcc.edu or send message via Remind.