MLAB 2221 Molecular Diagnostics (Hybrid)

Course Syllabus: Summer 2020

"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
	By Appt.	By Appt.	By Appt.	By Appt.	By Appt.	Anytime

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: The Molecular Diagnostics course will introduce the fundamentals of molecular diagnostic testing in the medical laboratory, including basic DNA and RNA structure, PCR, RT-PCR, Southern blotting, and electrophoresis. This course will cover the application of molecular diagnostic techniques in the identification and diagnosis of genetic diseases and diseases caused by microorganisms.

Prerequisite(s): Admitted in the MLT Program

Student Learning Outcomes: The primary goal of this course is to provide students with an understanding of the basic principles and clinical significance of laboratory testing in the field of molecular diagnostics. Students are expected to learn the basic principles of DNA replication and how to perform basic molecular diagnostic techniques. Upon completion of this course, the student should be able to do the following:

- Describe the basic structure of DNA and RNA
- Describe the basic process of DNA replication
- Perform DNA extraction on a clinical specimen
- Demonstrate an understanding of basic molecular diagnostic techniques
- Demonstrate an understanding of electrophoresis in the separation of DNA fragments
- Apply molecular diagnostic techniques to the identification and diagnosis of diseases
- Understand the basics in quality control and quality assurance

Evaluation/Grading Policy: (Subject to change)

4 Medialab exams	*A*	*≥90%*
8 Homework assignments	*B*	*80-89%*
4 Laboratory experiments	*C*	*70-79%*
1 Comprehensive final exam	*D*	*60-69%*
	F	*<60%*

Final grade will be a combination of homework, exams, and participation in laboratory exercises. Homework and exams will account for 75% of the final grade and participation in laboratory exercises, 25%.

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: Buckingham, Lela: Molecular Diagnostics Fundamentals, Methods, and Clinical Applications; 2 ed.:

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

Optional Instructional Materials: Laptop

Required Computer Literacy Skills:

Scan Competency	Molecular Diagnostics
Resources	Identify reagents, supplies and equipment needed for each laboratory procedure and organize laboratory procedures so that reagents, supplies and equipment are utilized correctly.
Interpersonal	Recognize limitations of expertise and communicate with instructor when questions arise. Show respect for instructor and peers during class time.
Information	Apply information gained from lecture, laboratory and independent study to problem-solve results provided as case studies or unknowns during the laboratory.
Systems	Apply critical thinking skills to problems encountered in the laboratory and theoretical case studies.
Technology	Achieve competency in routine molecular diagnostics procedures.

1. **Course Structure and Overview**: Attend all classes and 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. Complete assigned readings before lecture over each topic.
3. Be prepared to take notes and participate in class.
4. You must EARN your grade; I do not GIVE grades.
5. Be respectful of your classmates and instructors.
6. Turn off cell phones/pagers or set to vibrate.

Makeup Policy: Homework must be completed in its entirety by the due date assigned by the instructor. Late or partial homework will **NOT** be accepted unless there is a valid excuse (to be determined by the instructor). Media Lab modules and exams must be completed by the assigned due date. There will be no make-ups or extensions. If the exam is not completed by the assigned due date, the student will receive a zero for that exam. Makeup work for laboratory assignments will only be scheduled in the event of an **EXCUSED** absence as determined by the instructor.

COURSE OUTLINE

Unit 1: Fundamentals of genetics and DNA replication
Unit 2: Specimen types and uses
Unit 3: DNA and RNA extraction and isolation
Unit 4: Polymerase chain reaction (PCR)
Unit 5: Resolution and detection of nucleic acids by electrophoresis
Unit 6: Analysis of nucleic acids by Southern blotting
Unit 7: Detection and identification of microorganisms using molecular techniques
Unit 8: Polymorphisms and mutations
Unit 9: Quality assurance and Quality Control-Pre-analytical, Analytical, Post analytical

Media Lab Module 1: Fundamentals of Molecular Diagnostics
Media Lab Module 2: Real-Time PCR
Media Lab Module 3: HPV and Molecular Testing for Cervical Cancer
Media Lab Module 4: Molecular Methods in Clinical Microbiology

Communications:

- **EMAIL**: Please check your NTCC email EVERYDAY. Email is the official form of communication used here at NTCC. All emailed questions to the instructor will be responded to within 8 hours, but usually within a few hours when possible. I will normally respond to you at least acknowledging that I received your inquiry and will answer as soon as possible.
- **TEXT MESSAGE NOTIFICATIONS**: Text messages will be accepted but only in an emergency basis or situation. Please use the office phone number or email first if all possible.
- **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:

Attendance and Absences: You are expected to attend ALL scheduled lectures and labs and take the exams as scheduled. You will be held responsible for all information covered in lecture. *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*. **Excessive unexcused absences will result in loss of points from your grade. More than two unexcused absences will result in a reduction of five (5) points being subtracted from your final grade (percentage). More than five unexcused absences will result in the student being dropped from the course.**

Two unexcused late class attendance equals one unexcused absence.

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.

Tentative Course Timeline (*note* instructor reserves the right to make adjustments to this timeline at any point in the term):

Tentative Exam Schedule:

Exam	Unit/Topics Covered	Date
Media Lab Exam 1	Fundamentals of Molecular Diagnostics	Due by 6/16
Media Lab Exam 2	Real Time PCR	Due by 6/23
Media Lab Exam 3	HPV and Molecular Testing for Cervical Cancer	Due by 6/30
Media Lab Exam 4	Molecular Methods in Clinical Microbiology	Due by 7/7
Comprehensive Final	Lecture Units 1 - 9	7/7

Tentative Laboratory Schedule:

Date	Laboratory Topic/Assignment
Tuesday, June 9	Lab Orientation; Molecular Diagnostics Virtual Lab, Quality Control
Tuesday, June 16	DNA Extraction
Tuesday, June 23	DNA Separation by Electrophoresis
Tuesday, June 30	DNA Replication by PCR
Each Week	Case Studies

Student Contract for MLAB 2221

I,_____, have received, read and understand the syllabus for MLAB 2221 Molecular Diagnostics, offered at Northeast Texas Community College.

_____
Student's signature

_____
Date

Current Contact Information:

Phone:_____

Cell phone:_____

Preferred email address:_____