AUSTIN COMMUNITY COLLEGE
MEDICAL LABORATORY TECHNOLOGY
MLAB 2479 Molecular Diagnostics Techniques
Master Course Syllabus
Semester/Year

Course Web Site: http://www.austincc.edu/mlt/mdtech/mdtech
Course Outline and Schedule: http://www.austincc.edu/mlt/mdtech/mdtech_schedule.html

This schedule is tentative. Do NOT print the schedule until instructed by the professor. The schedule is subject to change. Any changes will be communicated by the professor.

Course Number and Name	Campus	Section	Synonym
MLAB 2479 Molecular Diagnostics Techniques	EVC	001	30422

FACULTY INFORMATION	
Campus	Eastview and DL
Instructor	
Office	
Office Hours	
Phone	
Email	

COURSE INFORMATION
Dates:
This class is hybrid, most of it is online. The class will meet on the following Saturdays: [dates] and [times]
Location: Eastview Campus, Room _____

Students will access and print out course materials from the course web site. Assessment activities are provided as a means of assisting students in determining their level of competence in given areas as well as to assist in reviewing for examinations. Assignments will be posted to enhance the student's learning experience.

ACC EMAIL
All College e-mail communication to students will be sent solely to the student's ACCmail account, with the expectation that such communications will be read in a timely fashion. ACC will send important information and will notify you of any college related emergencies using this account. Students should only expect to receive email communication from their instructor using this account. Likewise, students should use their ACCmail account when communicating with instructors and staff. Instructions for activating an ACCmail account can be found at http://www.austincc.edu/accmail/index.php.

COURSE DESCRIPTION
This course provides an introduction to the theory and use of molecular techniques in the diagnostics lab, with an emphasis on nucleic acids isolation, handling, and storage. Analytical techniques common to the molecular lab such as polymerase chain reaction (PCR), quantitative real time PCR (qRT-PCR), microarray analysis, and DNA bioinformatic tools will be emphasized. The laboratory exercises are designed to provide a hands-on context for the topics being presented in the course lectures and in the readings from the course textbook.

PREREQUISITES
Completion of MLAB 2378.

COURSE GOALS/RATIONALE

1. Apply knowledge of cellular structure and function, especially DNA and RNA, to molecular diagnostic procedures.
2. Gain a thorough working knowledge of nucleic acid extraction, resolution and detection.
3. Gain a solid foundation in the most commonly utilized molecular diagnostic testing protocols.
4. Apply the knowledge of molecular testing to the most commonly performed applications in the clinical laboratory such as: nucleic acid extraction, resolution and detection, analysis and characterization of nucleic acids and proteins, nucleic acid amplification and DNA sequencing.

COURSE OBJECTIVES

1. Identify the important parameters in the design of a laboratory to conduct the most commonly used molecular diagnostic procedures.
2. Identify the important parameters in the design of a quality system for molecular analyses.
3. Become proficient with the techniques required to perform the most commonly used molecular diagnostics protocols.
4. Identify the components of a well-controlled diagnostic test.
5. Use critical thinking skills to trouble shoot problems as they occur and determine possible causes.

MATERIALS REQUIRED

1. Textbook: Molecular Diagnostics: Fundamentals, Methods and Clinical Applications. Authors: Lela Buckingham and Maribeth Flaws.
   ISBN-10: 0803616597
   ISBN-13: 978-0803616592
2. Two inch binder with dividers.
3. Electronic timer - does NOT have to be lab quality.
4. Gloves

SCANS COMPETENCIES

Recently the U.S. Department of Labor established the Secretary's Commission on Achieving Necessary Skills (SCANS) to examine the demands of the workplace and whether the nation's students are capable of meeting those demands. The Commission determined that today's jobs generally require competencies in the following areas.

a. Resources: Identifies, organizes, plans, and allocates resources
b. Interpersonal: Works with others
c. Information: Acquires and uses information
d. Systems: Understands complex interrelationships
e. Technology: Works with a variety of technologies

The Texas Higher Education Coordinating Board is now requiring all degree plans in institutions of higher education incorporate these competencies and identify to the student how these competencies are achieved in course objectives.

Examples of SCANS competencies being incorporated are as follows:

COMPETENCY	EXAMPLE
Resources	Determines amounts of materials needed for designated procedures to preserve expensive resources.
Interpersonal	Expresses opinions and interacts with others in a tactful, professional manner.
Information	Acquires, evaluates, organizes and interprets information as it relates to Molecular Diagnostics.
Systems	Knows how technological systems work and is able to diagnose deviations in

	procedures and predict how to correct malfunctions.
Technology	Chooses procedures, tools or equipment including computers and related technologies.

PROGRAM STUDENT LEARNING OUTCOMES
Upon successful completion of the **Molecular Diagnostics Enhanced Certificate,** the student will:

1. Apply knowledge of cellular structure and function, especially DNA and RNA, to molecular diagnostic procedures.
2. Demonstrate a thorough working knowledge of nucleic acid extraction, resolution and detection.
3. Perform the most frequently utilized molecular diagnostic testing protocols.
4. Apply the knowledge of molecular testing to the most commonly performed applications in the clinical laboratory such as: nucleic acid extraction, resolution and detection, analysis and characterization of nucleic acids and proteins, nucleic acid amplification and DNA sequencing.
5. Develop proficiency in the clinical competencies of the rotation by applying basic principles and procedures, demonstrating organizational skills and accurate performance of technical skills.

INSTRUCTIONAL METHODOLOGY
1. Textbook reading assignments
2. Powerpoint presentations
3. Internet Web Sites - http://www.austincc.edu/mlt/mdfund/mdfund_links.html
4. BlackBoard (http://acconline.austincc.edu)

A portion of this course will be conducted via the computer through the Blackboard online learning system. All students will be required to have an email address and are expected to use the computer to access course materials, learning activities, and exams on-line. Students who do not have access to home computers should be prepared to access all materials and take exams at a public computer which are readily available in the Austin area; including those in the Learning Labs and libraries at all ACC campuses. Visit http://www.austincc.edu/tutor/students/computers.php for locations and hours of operation. Before taking any on-line exams, students should verify that the computer they are using (and its internet access) will be available to them for the duration of the test.

BLACKBOARD ON-LINE SYSTEM
A considerable portion of this course will be conducted via the computer on-line Blackboard learning system. All students will be required to have an email address and to access course materials, learning activities, and exams on-line. Students may use their home computers OR may access all materials and take exams at any public computer, including those in Learning Labs and libraries at all ACC campuses.

How to Log Into Blackboard
1. To access Blackboard, go to http://acconline.austincc.edu/
2. Enter your ACCeID and ACCeID Password in the provided boxes, and then click on the “Login” button.
3. Access your course(s) by clicking the course title located in the My Courses module.
4. ACC Blackboard support website is http://irt.austincc.edu/blackboard/.

COURSE POLICIES
Students are expected to be prepared for each class and to participate in all class activities. Students should expect to spend at least 2 hours outside of class for each our spent in class in order to earn a grade of C. More time may be needed to pass or to get a higher grade, depending on the background and preparation of the student coming into the course. Make sure you have enough time to accomplish your goals.

Attendance
It is of the utmost importance that students miss no classes in order to perform well in this class. As with all science courses, topics build from each other in this course so that a gap in knowledge will prevent the student from understanding future concepts being covered. Attendance will be taken at each class period. Students who are late or absent are responsible for obtaining information about deadlines, lecture notes, class discussions, handout materials, class activities, homework assignments or announcements given during the missed class time.

If you must miss a class day please notify the instructor by email the date of the expected absence. The student will be required to arrange a time with the instructor to make up the activity, although this may not be possible due to the nature of the materials utilized in the laboratory.

Dress Code
The student will be expected to attend class clean and neatly dressed and wear closed-toe shoes. A disposable laboratory coat will be issued to each student and must be worn snapped during all laboratory sessions. Hair that is shoulder length or longer ***must*** be worn up or securely tied back. Gloves must be worn when handling biological materials.

Exams
Exams are given through BlackBoard. The highest level of honesty is expected of each student. If a student misses one exam, the grade of the final exam will be averaged in the place of the missed exam grade. If any other exams are missed, grades of "0" will be given. Academic honesty is imperative. Exam grades will be compared to the final exam grade. The exam grade average must be comparable to the final exam grade.

Missed Work
Assignments are due by the dates stated on the course schedule. Few things can hurt your grade as much as getting behind in the work. If you are absent send your assignment in to me by the due date in an email. Late work will be accepted but will be given a 10% penalty EACH DAY that it is late. No work will be accepted after one week.

Class Participation
Each student is strongly encouraged to participate in class. In any classroom situation that includes discussion and critical thinking, there are bound to be many differing viewpoints. These differences enhance the learning experience and create an atmosphere where students and instructors alike will be encouraged to think and learn. On sensitive and volatile topics, students may sometimes disagree not only with each other but also with the instructor. It is expected that faculty and students will respect the views of others when expressed in classroom discussions

STUDENT EVALUATION

1. Points will be awarded as follows:
   a) Two major exams 200 points
   b) Comprehensive Final Exam 200 points
   c) Homework and other written assignments 100 points
   d) Laboratory Activities 250 points

2. Grading System
   A = 90 -100%
   B = 80 - 89%
   C = 70 - 79%
   D = 60 - 74%
   F = 59% or below

I=Incomplete: A student must have a passing average and have completed at least 80% of the course work. The student will be permitted to register for MAB 2263 with the understanding that the incomplete for MLAB 2479 will be completed within the same semester. No credit will be given for MLAB 2263 unless MLAB 2479 is completed.

WITHDRAWAL POLICY
It is the responsibility of each student to ensure that his or her name is removed from the roll should he or she decides to withdraw from the class. The instructor does, however, reserve the right to drop a student should he or she feel it is necessary. If a student decides to withdraw, he or she should also verify that the withdrawal is submitted before the Final Withdrawal Date. The student is also strongly encouraged to retain their copy of the withdrawal form for their records.

Students who enroll for the third or subsequent time in a course taken since Fall, 2002, may be charged a higher tuition rate, for that course.

State law permits students to withdraw from no more than six courses during their entire undergraduate career at Texas public colleges or universities. With certain exceptions, all course withdrawals automatically count towards this limit. Details regarding this policy can be found in the ACC college catalog.

SCHOLASTIC DISHONESTY
A student attending ACC assumes responsibility for conduct compatible with the mission of the college as an educational institution. Students have the responsibility to submit coursework that is the result of their own thought, research, or self-expression. Students must follow all instructions given by faculty or designated college representatives when taking examinations, placement assessments, tests, quizzes, and evaluations. Actions constituting scholastic dishonesty include, but are not limited to, plagiarism, cheating, fabrication, collusion, and falsifying documents. Penalties for scholastic dishonesty will depend upon the nature of the violation and may range from lowering a grade on one assignment to an “F” in the course and/or expulsion from the college. See the Student Standards of Conduct and Disciplinary Process and other policies at http://www.austincc.edu/current/needtoknow

Academic dishonesty such as, but not limited to, the following may result in IMMEDIATE dismissal from the MLT program and withdrawal from all MLT courses. If the withdrawal date has passed the student will be given a “D” for each course.

1. Submitting homework assignments copied from others. Both the student and the student that the materials were borrowed from will receive a “0" for the assignment and may be subject to the Academic Dishonesty Process and dismissal from the program.
2. Falsifying laboratory results.
3. Printing out examinations.

FREEDOM OF EXPRESSION/STUDENT RIGHTS AND RESPONSIBILITIES
Students at the college have the rights accorded by the U.S. Constitution to freedom of speech, peaceful assembly, petition, and association. These rights carry with them the responsibility to accord the same rights to others in the college community and not to interfere with or disrupt the educational process. Opportunity for students to examine and question pertinent data and assumptions of a given discipline, guided by the evidence of scholarly research, is appropriate in a learning environment. This concept is accompanied by an equally demanding concept of responsibility on the part of the student. As willing partners in learning, students must comply with college rules and procedures.

Each student is strongly encouraged to participate in class. In any classroom situation that includes discussion and critical thinking, there are bound to be many differing viewpoints. These differences enhance the learning experience and create an atmosphere where students and instructors alike will be encouraged to think and learn. On sensitive and volatile topics, students may sometimes disagree not

only with each other but also with the instructor. It is expected that faculty and students will respect the views of others when expressed in classroom discussions.

AUSTIN COMMUNITY COLLEGE SAFETY
Austin Community College is committed to providing a safe and healthy environment for study and work. You are expected to learn and comply with ACC environmental, health and safety procedures and agree to follow ACC safety policies. Additional information on these can be found at http://www.austincc.edu/ehs.

Because some health and safety circumstances are beyond our control, we ask that you become familiar with the Emergency Procedures poster and Campus Safety Plan map in each classroom when on campus and at the clinical site when you are at clinical. Additional information about emergency procedures and how to sign up for ACC Emergency Alerts to be notified in the event of a serious emergency can be found at http://www.austincc.edu/emergency/.

You are expected to conduct yourself professionally with respect and courtesy to all. Anyone who thoughtlessly or intentionally jeopardizes the health or safety of another individual will be immediately dismissed from the day's activity, may be withdrawn from the class, and/or barred from attending future activities.

STUDENT ASSISTANCE POLICY
It is the sincere desire of the program faculty to aid each student in developing his/her professional potential. Academic, clinical, and those personal problems that interfere with the student's development are of concern to the faculty. The program faculty has adopted the following policy:

- **Personal Problems**

The MLT student should feel free to make an appointment to discuss problems of a personal nature with a faculty member of his/her choice. In addition, the Health Science counselors are available for the student for additional counseling, if necessary.

- **Academic Problems**

Problems encountered in the MLT lecture and/or laboratory sections should be brought to the attention of the course instructor. The instructor will work with the student to resolve the problem. If the student feels he/she cannot reach an agreement with the instructor, the student with the instructor should present the situation to the Program Director. All discussions with the faculty will remain confidential.

PROMOTION, FAILURE OR DISMISSAL FROM THE PROGRAM
1. MLAB 2479 is the second of three courses in the Molecular Diagnostics certificate program. A minimum grade of "C" (70%) is required in of all Molecular Diagnostics course work to continue to the next course.
2. Any student may be dropped from the program due to consistently failing to meet class assignments.
3. The student may utilize the student "Complaints and Grade Disputes" process in the disposition of a complaint without fear of recrimination or retaliation. This is at the ACC "Need to Know" web site http://www.austincc.edu/current/needtoknow/ .
4. The MLT faculty and staff understand that learning in group situations can be beneficial. However, each student is expected to demonstrate his/her own competency by doing his/her own work. Any student caught cheating on examinations or submitting work that is not their own will be subject to disciplinary action, including an academic penalty and possible withdrawal from the program.

STUDENTS WITH DISABILITIES
Each ACC campus offers support services for students with documented disabilities. Students with disabilities who need classroom, academic or other accommodations must request them through the Office for Students with Disabilities (OSD). Students are encouraged to request accommodations when they register for courses or at least three weeks before the start of the semester, otherwise the provision of accommodations may be delayed. Students who have received approval for accommodations from

OSD for this course must provide the instructor with the 'Notice of Approved Accommodations' from OSD before accommodations will be provided. Arrangements for academic accommodations can only be made after the instructor receives the 'Notice of Approved Accommodations' from the student.

Students with approved accommodations are encouraged to submit the 'Notice of Approved Accommodations' to the instructor at the beginning of the semester because a reasonable amount of time may be needed to prepare and arrange for the accommodations. Additional information about the Office for Students with Disabilities is available at: http://www.austincc.edu/support/osd/

LABORATORY SAFETY

1. It is the responsibility of the student to prepare for each laboratory session. Each student is responsible for his/her own work and for the cleaning up of their work station.
2. Cell phones, MP3 players and all other electronic devices are prohibited from use in the laboratory.
3. Follow all safety regulations during activities scheduled in the student laboratory as described in the MLT Safety Manual.
4. Standard Precautions
    a. Use barrier protection routinely to prevent skin and mucous membrane contamination with blood or other body fluids.
    b. Wear gloves:
        i. When cuts, scratches, or other breaks in skin are present.
        ii. When performing any type of blood collection.
        iii. Whenever blood and body fluid specimens are handled.
        iv. Anytime it appears that contamination of the hands may occur.
    c. Wear a mask, eye glasses or goggles, or face shield during procedures that are likely to generate droplets of blood or other body fluids to prevent exposure of the mucous membranes of the mouth, nose, and eyes.
    d. Wear a fluid-resistant lab coat, apron, or other covering when there is a potential for splashing or spraying of blood or body fluids onto the body.
    e. Wash hands or other skin surfaces thoroughly and immediately if contaminated with blood or other body fluids.
    f. Wash hands immediately after gloves have been removed even when no external contamination has occurred. .
    g. All specimens of blood and body fluids should be put in well-constructed containers with secure lids to prevent leaking during transport.
    h. Use pipette bulbs for manipulating *all* liquids (including body fluids, chemicals, or reagents) in the laboratory, NEVER pipette by mouth.
    i. Decontaminate all laboratory work areas with an appropriate chemical germicide after a spill of blood or other body fluids and when work activities are completed. Laboratory counter tops should be disinfected before you leave each day.
    j. Clean and decontaminate scientific equipment that has been contaminated with blood or other body fluids before being repaired in the laboratory or transported to the manufacturer. Always follow manufacture's recommendations.
    k. Remove gloves, wash hands and remove lab coat prior to leaving the student laboratory for any reason.
    l. ***All accidents are to be reported immediately to the laboratory instructor.***

MLAB 2479 Molecular Diagnostics Techniques
Statement of Understanding

INSTRUCTIONS: Carefully review the course syllabus and email your instructor with any questions. **Type your initials next to each of the items below** to indicate that you have read and understand the Course Syllabus, that you have had an opportunity to ask questions about any items you did not understand and that you agree to abide by all of the policies, procedures, and requirements stated within. Type your name at the bottom of this form with the date. You may copy paste this completed page into an email or new Word page, print and scan and attach to an email FROM YOUR ACC GMAIL ACCOUNT.

Initials required here

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_____ Course Goals
_____ Course Objectives
_____ Course Requirements and Regulations
_____ Attendance Requirements
_____ Criteria for calculation of the course grade.
_____ Requirements for promotion, failure and dismissal from the program.

_____ _____
Signature **Date**

_____
Printed Name