Virginia Western Community College
MDL 243
Introduction to Clinical Molecular Diagnostics

Prerequisites
Successful completion of all MDL Program-related courses with a grade of "C" or better.

Course Description
Provides the fundamentals of genetics and inheritance along with an overview of the basic principles of clinical molecular diagnostics. Discusses the use of common molecular techniques in the diagnosis of disease.

General Course Purpose
The purpose of this course is to introduce the student the basic concepts and techniques used in molecular diagnostics. Topics to be covered include: history of molecular concepts; nucleic acid function and structure; human genetics; DNA structure; nucleic acid isolation, identification and amplification techniques; and components of a clinical molecular diagnostics

Course Prerequisites/Corequisites
Must be in the final year of the Medical Laboratory Technology AAS degree program or have division approval

Semester Credits: 2 Lecture Hours: 2 Lab/Clinical/Internship Hours: N/A

Required Materials

Textbook:
TBD

Other Required Materials:
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Course Outcomes

At the completion of this course, the student should be able to:

- Describe chromosome function and structure.
- Discuss the basic principles of genetics.
- Describe the structure and purpose of nucleotides and how they relate to amino acid formation.
- Describe chromosomal structure mutations.
- Describe methods for nucleic acid extraction and detection.
- Discuss the amplification of DNA and RNA.
- Summarize techniques used in the molecular diagnostics laboratory.
- List and describe the methods for analysis and characterization of nucleic acids and proteins.

- State the required quality assurance and quality control measures required in a molecular diagnostics laboratory.

Topical Description

- History of Molecular diagnostics
- Chromosome Structure and Function
- Nucleic Acid Structure and Organization
- Nucleic Acid Physiology and Regulation
- Genetic Alterations & Mutations
- Nucleic Acid Isolation
- Nucleic Acid Amplification
- Nucleic Acid Identification
- Restriction Enzymes and Hybridization Techniques
- Electrophoresis
- DNA Sequencing
- Specimen Collection and Handling & Quality Assurance Issues in the Molecular Lab
- Molecular testing of Infectious Disease and Microorganisms
- Molecular Oncology

Notes to Instructors

ADA Statement

https://www.virginiawestern.edu/wp-content/uploads/2024/12/Syllabus-Statement_ADA.pdf

Title IX Statement

https://www.virginiawestern.edu/wp-content/uploads/2024/12/Syllabus-Statement_Title-IX-2025.pdf