

**NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY**  
**MDL 243 – INTRODUCTION TO CLINICAL MOLECULAR DIAGNOSTICS (2 CR.)**

**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. Lecture 2 hours per week. Total 2 hours per week

**General Course Purpose**

The purpose of this course is to introduce the student to the basics concepts and techniques used in molecular diagnostics. Topic 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 laboratory.

**Course Prerequisites/Corequisites**

Students should be enrolled in the second year of the Medical Laboratory Technology AAS degree program Completion of the first-year core courses with a grade of “C” or better or receive program director approval.

**Course Objectives**

Upon completing the course, the student will 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

**Major Topics to be Included**

History of molecular diagnostics

Chromosome structure and function

Nucleic acid structure, organization, physiology and regulation

Genetic alterations and mutations

Nucleic acid isolation, amplification and 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 and other current applications

Molecular oncology