Berkshire Medical Center
School of Medical Laboratory Science

Course Syllabus

Course No. MEDT 407
Course Title: Clinical Molecular Biology

Credits: 1

Description:
Introduces the student to the basic fundamentals of nucleic acid biochemistry. Discusses common techniques in molecular biology and specifically in the clinical laboratory. Discusses the impact of molecular genetics in medicine and specific methods for analysis. Describes the controllable and non-controllable pre-analytical, analytical, and post-analytical variables that can affect testing. The student applies this theory in the molecular biology laboratory using current diagnostic techniques and instrumentation to correlate lab results with disease.

Primary Didactic Instructor: Jana McGinnis, M.S., MB(ASCP)
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Required text: Molecular Diagnostics: Fundamentals, Methods, and Clinical Applications, 3rd edition, Lela Buckingham, 2019

Reference material: Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics, 7th ed. Carl Burtis, David Bruns, 2015
Self Study - Basic to Intermediate Level- Understanding Molecular Pathology: Methodologies and Applications

Lecture: 1 hour lecture, 8 total lectures

Laboratory: 4 week clinical rotation in the Molecular Biology Department.
**See individual student schedule for dates

Course Goals and Objectives

Based on the didactic material and clinical instruction students will score an average of 75% or better on evaluation tools (i.e. exams, evaluations, etc) to demonstrate competency of the following objectives.

Upon completion of the Molecular Biology clinical and didactic course the student will:

1. Develop a basic understanding of protein function, genetic mechanisms, and the human genome.
2. Develop an entry-level knowledge of Molecular Biology tests used in the clinical laboratory and their importance in the diagnosis and treatment of disease.
3. Discuss physiological mechanisms that lead to specific genetic disorders and disease states.
4. Discuss the current prevention and treatment for disease and disorders related to molecular pathology.
5. Explain the principles and methods of each test performed in the Molecular Biology laboratory and the clinical significance.
6. Compare the different types of probes used in the Molecular Biology laboratory.
7. Compare and contrast the different types of nucleic acid amplification methods.
8. Explain the importance of quality control and apply it in the laboratory setting.
9. Determine appropriate specimen collection, processing, and analysis of patient specimens by following established procedures and resolve specimen issues.
10. Perform manual and automated testing on patient blood or body fluids that result in valid laboratory results in the Molecular Biology department.
11. Perform routine maintenance, trouble shooting, and quality control on instrumentation in the Molecular Biology department following established procedures.
12. Evaluate quality control data and determine course of action when quality control falls outside of range.
13. Interpret laboratory data generated from the Molecular Biology laboratory regarding test accuracy and abnormal values.
14. Evaluate laboratory data and give possible cause or diagnosis for patient results.
15. Organize workflow for efficiency in lab testing turn-around-times.
16. Practice established confidentiality guidelines.
17. Demonstrate professional and ethical conduct with all healthcare professionals, consumers, patients, and other laboratory students.

Basis for Student Evaluation

Lecture evaluation will consist of study question and a final exam. The laboratory evaluation will consist of written exams, study questions, and objective/psychomotor evaluations. The final grade will be composed of 50% lecture and 50% laboratory. See Molecular Biology grade sheet for specific breakdown.

Affective behaviors

Didactic

Following appropriate training, during didactic instruction the student will:

1. Exhibit professional behavior during didactic instruction.
2. Attend lectures in a timely manner.
3. Respect other students and members of the laboratory.
4. Contribute to a positive learning environment.
5. Demonstrate an interest in the subject matter.
6. Comply with hospital and laboratory dress code and personal appearance policies.
7. Comply with institutional policies concerning safety.
8. Cooperate when situations arise and there is a necessary change in lecture schedule.

Clinical

Following appropriate training, during clinical instruction the student will:

1. Comply with all hospital, laboratory, and school policies.
2. Demonstrate phone etiquette using BHS customer service standards.
3. Maintain a neat, clean, and orderly work area in the Molecular department.
4. Value the advice and opinion of others.
5. Accept responsibility for his/her own actions.
6. Be dependable and punctual for the clinical experience.
7. Organize his/her time to complete assignments and daily training.
8. Accept constructive criticism and use it as a tool for improved performance.
9. Establish a good rapport with co-workers and uphold the concept of teamwork.