Medical Biochemistry (MMD-894)

Credit Hours 3 (3-0)

Course Description

This course will be a detailed study of the chemical and instrumental analyses of human biological material of clinical significance. The student will be introduced to commonly used clinical chemistry techniques. This course discusses the clinical aspects of Lab Math, Sources of errors, carbohydrates, Amino-acid, proteins, Vitamins, Trace Elements, enzymes, electrolytes. This course will integrate the following topics into the laboratory and lecture sessions: laboratory mathematics, quality assurance, specimen collection and processing, sources of biological variation, and evaluation techniques.

Educational Objective

To make sure that the student is able to:

- Realize, understand and deal with numerical values in the clinical lab in the best possible way to reflect accuracy and precision of the given value (significant figures, decimals, scientific notation, rounding off numbers)
- Identify the primary biological function of carbohydrate in humans.
- Describe, in general terms, the metabolism of carbohydrates in humans.
- Compare and contrast the four types of utilization of glucose: glycogenesis, gluconeogenesis, glycolysis, glycogenolysis.
- Students are given the fundamental concepts of metabolic disorders and their pathways.
- The students are required to know the clinical significance of proteins and to differentiate between various fractions of proteins depending upon their functions. Students are made aware of the importance of vitamins as essential component of daily nutrition.

Course Outcomes

The students will be able to:

- Apply principles of safety, quality assurance and quality control in Clinical Biochemistry.
- Evaluate specimen acceptability for chemical analysis

- Compare and contrast human body chemistry levels under normal and abnormal conditions
- Explain, perform and evaluate clinical chemistry procedures and correlate test results with patient conditions

Course Contents

1. Course Scope
2. Basic & Lab Math
3. Source & Types of Errors & QC
4. Carbohydrates
5. Proteins
6. Trace Elements
7. Vitamins
8. Enzymology
9. Electrolytes & Ca, Mg, P
10. Lipids and Lipoproteins
11. Nonprotein Nitrogen and Renal Function
12. Blood Gases, pH, and Acid–Base Balance
13. Mineral and Bone Metabolism
14. The Endocrine System
15. Pancreas
16. Cardiac Function
17. Liver Function
18. Toxic Substances

Recommended Books

1. Bishop, M. (2020). *Clinical chemistry: principles, techniques, and correlations*. Jones & Bartlett Publishers.
2. Sacks, D. (2001). Clinical Diagnosis and Management by Laboratory Methods, John Bernard Henry, ed. Philadelphia: WB Saunders, 2001, 1512 pp., $99.00. ISBN 0-7216-8864-0. *Clinical Chemistry*, *47*(12), 2188-2189.
3. Burtis, C. A., & Bruns, D. E. (2014). *Tietz fundamentals of clinical chemistry and molecular diagnostics-e-book*. Elsevier Health Sciences.