

## HIBBINGCOMMUNITY COLLEGE COURSE OUTLINE

**COURSE NUMBER & TITLE:** MLT 2445: Clinical Chemistry 2

**CREDITS:** 2 (2 Lec/0 Lab)

**PREREQUISITES:** MLT 1425 Clinical Chemistry 1

### CATALOG DESCRIPTION:

Clinical Chemistry 2 covers detailed theory and representative laboratory analyses of electrolytes; arterial blood gases; vitamins and vitamin deficiencies; trace elements such as calcium and magnesium; endocrine function, and therapeutic drug monitoring.

### OUTLINE OF MAJOR CONTENT AREAS:

1. Electrolytes
2. Arterial blood gas analysis
3. Vitamin deficiencies
4. Trace elements (Calcium, Magnesium)
5. Endocrine function
6. Therapeutic drug monitoring

### COURSE GOALS/OBJECTIVES/OUTCOMES:

Students will

1. state the clinical significance of each of the following analytes: sodium, potassium, chloride, bicarbonate, CO<sub>2</sub>, magnesium, and calcium.
2. calculate the anion gap and discuss the clinical usefulness of anion gap calculation.
3. calculate and interpret osmolal gap, given the respective laboratory values.
4. describe the appropriate procedure and precautions when obtaining blood for arterial or venous measurement of blood gasses.
5. discuss the *in vitro* changes in specimens for blood gas analysis.
6. list the normal range for blood pH.
7. discuss the role of the kidneys in acid-base balance.
8. identify metabolic or respiratory alkalosis or acidosis given pertinent case histories and lab results.
9. describe how PCO<sub>2</sub>, PO<sub>2</sub>, and pH are commonly measured.
10. classify the water soluble and fat soluble vitamins and list the medical implications of mega dosing.
11. list the clinical conditions associated with: vitamin A deficiency, vitamin C deficiency, vitamin D deficiency, vitamin K deficiency, and B complex vitamin deficiencies.

12. discuss the general function and control of the endocrine system.
13. Name the hormone(s) produced by each of the following tissues: anterior pituitary, posterior pituitary, adrenal medulla, adrenal cortex, thyroid, parathyroid, ovaries, testes, and placenta.
14. discuss the clinical significance associated with abnormal thyroid f test values.
15. list the major physiological characteristics associated with Cushing's syndrome and Addison's disease and the laboratory tests that are useful in diagnosing these disorders.
16. describe the physiologic functions of calcium and how its plasma concentration is regulated.
17. describe the physiologic functions of magnesium.
18. state two reasons for measuring drug levels.
19. list three major routes for drug administration.
20. list several things that affect blood level drug concentrations.
21. list, in a general way, the therapeutic indications for the following commonly monitored therapeutic drugs: phenobarbital, phenytoin, carbamazepine, ethosuximide, digoxin, theophylline, aminoglycosides, vancomycin, and lithium.
22. describe colorimetric procedures for salicylate and acetaminophen quantitation.
23. discuss the adverse consequence of salicylate and acetaminophen poisoning.
24. list the most common classes of drugs that are included in urine-drugs of abuse screening.
25. distinguish between drug screening and drug confirmatory methods
26. compare and contrast methodology, advantages, and disadvantages of ethanol analysis.
27. explore employment opportunities and career objectives in toxicology and forensic toxicology.
28. apply prior knowledge to problem solving including recognition of abnormal or unusual test results, recognition of unacceptable quality control results and verification of test results.

### **Psychomotor Objectives:**

At the conclusion of this course, the student will be able to

1. develop Levey-Jenning charts for a clinical analyte. Student must demonstrate an understanding of standard deviations, control ranges, and quality control reports.
2. demonstrate safe and professional work habits. Student is expected to consistently follow laboratory safety procedures consistent with OSHA and Laboratory policy.

### **MNTC GOALS AND COMPETENCIES MET:**

N/A

**HCC COMPETENCIES MET:**

Working Productively & Cooperatively  
Communicating Clearly & Effectively.

**STUDENT CONTRIBUTIONS:**

Students are expected to attend all lectures and labs, complete assignments on time, and spend necessary study time to pass all exams.

**STUDENT ASSESSMENT SHALL TAKE PLACE USING INSTRUMENTS  
SELECTED/DEVELOPED BY THE COURSE INSTRUCTOR.**

**SPECIAL INFORMATION: (SPECIAL FEES, DIRECTIVES ON HAZARDOUS  
MATERIALS, ETC.)**

N/A

**AASC APPROVAL: March 25, 2015**

**REVIEW DATE: March 2020**

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