



## COURSE OUTLINE: CHMI2220 - CLINICAL CHEMISTRY

Prepared: Ann Boyonoski

Approved: Bob Chapman, Chair, Health

<b>Course Code: Title</b>	CHMI2220: CLINICAL CHEMISTRY								
<b>Program Number: Name</b>	3400: COLLAB BSCN								
<b>Department:</b>	BSCN - NURSING								
<b>Semesters/Terms:</b>	18F, 19W								
<b>Course Description:</b>	A course designed for students in nursing to develop an appreciation for the usefulness of the objective data generated by the clinical chemistry laboratory. Students should gain insight into the relationship between various common diseases, the underlying biochemistry and the clinical tests used in their diagnosis and therapeutic monitoring.								
<b>Total Credits:</b>	6								
<b>Hours/Week:</b>	6								
<b>Total Hours:</b>	144								
<b>Prerequisites:</b>	BIOL2105								
<b>Corequisites:</b>	There are no co-requisites for this course.								
<b>This course is a pre-requisite for:</b>	BSCN3005, BSCN3056, BSCN3084, BSCN3206, BSCN3406								
<b>General Education Themes:</b>	Science and Technology								
<b>Course Evaluation:</b>	Passing Grade: 60%, C								
<b>Books and Required Resources:</b>	Clinical Chemistry by Marshall et al Publisher: Elsevier - Health Sciences Division Edition: 8th ISBN: 9780723438816  Pathophysiology: Introductory Concepts and Clinical Perspectives by Capriotti, T. & Frizzell, JP. Publisher: FA Davis ISBN: 9789803615717								
<b>Ends in View and Processes:</b>	<table><tr><th>Ends in View</th><th>Process</th></tr><tr><td>1. Introduction to Clinical Chemistry and Evidence-based Laboratory Medicine.</td><td>1.1 Outline the factors involved in acquiring objective data. 1.2 Describe and employ the statistical techniques used to ensure quality control. 1.3 Discuss the role of the laboratory in effective patient care. 1.4 Explain and demonstrate the factors used in assessing biochemical data. 1.5 Discuss the role of the laboratory in therapy and evaluation.</td></tr><tr><th>Ends in View</th><th>Process</th></tr><tr><td>2. Basic Biochemistry and Techniques.</td><td>2.1 List the major categories of organic molecules in the human body. 2.2 Describe the structure and function of the macromolecules.</td></tr></table>	Ends in View	Process	1. Introduction to Clinical Chemistry and Evidence-based Laboratory Medicine.	1.1 Outline the factors involved in acquiring objective data. 1.2 Describe and employ the statistical techniques used to ensure quality control. 1.3 Discuss the role of the laboratory in effective patient care. 1.4 Explain and demonstrate the factors used in assessing biochemical data. 1.5 Discuss the role of the laboratory in therapy and evaluation.	Ends in View	Process	2. Basic Biochemistry and Techniques.	2.1 List the major categories of organic molecules in the human body. 2.2 Describe the structure and function of the macromolecules.
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	2.3 Demonstrate an understanding of the most common techniques utilized by the laboratory.
<b>Ends in View</b>	<b>Process</b>
3. Metabolic Aspects of Malignant Disease.	3.1 Describe the role of membrane proteins in the transport of molecules in and out of cells as well as receptors for regulation extracellular molecules such as hormones. 3.2 Review the general pathophysiology of cellular changes. 3.3 Describe the pathophysiological changes occurring in paraneoplastic endocrine syndromes. 3.4 Discuss the biochemical changes that can be detected in malignant endocrine syndromes. 3.5 Discuss the presence and detection of tumour markers as a means of diagnosing a variety of malignant conditions.
<b>Ends in View</b>	<b>Process</b>
4. Renal Management of Fluid, Electrolyte, Acid, and Base Balance.	4.1 Discuss the homeostasis of water and sodium and the consequences of breakdown in this system. 4.2 Outline and discuss the laboratory testing employed in the assessment of sodium and water excess and depletion. 4.3 Discuss the homeostasis of potassium and the consequences of breakdown in this system. 4.4 Outline and discuss the laboratory testing employed in the assessment of potassium excess and depletion. 4.5 Discuss the homeostasis of calcium, phosphate, and magnesium and the consequences of breakdown in this system. 4.6 Outline and discuss the laboratory testing employed in the assessment of calcium, phosphate, and magnesium. 4.7 Discuss the buffering of solutions in the human body. 4.8 Describe the tests employed in assessing the acid/base status of a patient. 4.9 Outline the common tests in the biochemical investigation of renal function. 4.10 Determine the effect of a variety of renal disorders on the maintenance of fluid, electrolyte, acid, base balance.
<b>Ends in View</b>	<b>Process</b>
5. Endocrine Function and Dysfunction.	5.1 Review and discuss the structure and function of the endocrine system. 5.2 Discuss special considerations in diagnosing endocrine disorders. 5.3 Examine in detail conditions and biochemical tests involving the hypothalamus and pituitary gland. 5.4 Examine in detail conditions and biochemical tests involving the thyroid gland. 5.5 Examine in detail conditions and biochemical tests involving the adrenal glands.
<b>Ends in View</b>	<b>Process</b>
6. Inflammation and Haematology.	6.1 Review and discuss the inflammatory process. 6.2 Review and discuss haematopoiesis. 6.3 Examine in detail the biochemical and cellular markers of

	<p>inflammation.</p> <p>6.4 Examine in detail haemostasis and the laboratory tests involved in measuring haemostasis.</p> <p>6.5 Examine in detail the various anemias and leukemias.</p>
<b>Ends in View</b>	<b>Process</b>
7. Lipids, Diagnostic Enzymes, and Cardiovascular Disease.	<p>7.1 Discuss the importance of plasma protein homeostasis and the biochemical means by which it can be evaluated.</p> <p>7.2 Examine in detail a variety of plasma proteins for function, diagnostic, and pathophysiological considerations.</p> <p>7.3 Describe the major types of plasma lipids, their sources, metabolism, and physiological role.</p> <p>7.4 Examine the diagnostic potential of plasma lipids and plasma enzymes in cardiovascular disease.</p> <p>7.5 Discuss the laboratory involvement in the detection and monitoring of haemoglobin deficiencies, porphyrias, and iron deficiencies.</p>
<b>Ends in View</b>	<b>Process</b>
8. Metabolic Disorders and Nutrition.	<p>8.1 Describe the various metabolic pathways.</p> <p>8.2 Identify the nutrients associated with human nutritional requirements and manifestations associated with their deficiency and/or toxicity.</p> <p>8.3 Describe the laboratory measurement of the various nutrients.</p> <p>8.4 Examine the complex fashion in which carbohydrates are processed and utilized in the human body.</p> <p>8.5 Describe the laboratory measurement for glucose concentration.</p> <p>8.6 Discuss laboratory involvement in the diagnosis, management, and treatment of diabetes.</p> <p>8.7 Examine the metabolic complications of diabetes and related comorbidities.</p> <p>8.8 Discuss the root cause of a variety of inherited metabolic disorders.</p>
<b>Ends in View</b>	<b>Process</b>
9. Gastrointestinal, Hepatic, and Biliary Considerations.	<p>9.1 Describe the common biochemical tests used in the investigation of gastric disorders.</p> <p>9.2 Describe the common biochemical tests used in the investigation of pancreatic disorders.</p> <p>9.3 Describe the common biochemical tests used in the investigation of enteric disorders.</p> <p>9.4 Describe the biochemical and physiological impact of a variety of gastric, pancreatic and enteric disorders.</p> <p>9.5 Describe the most common disease processes affecting the liver.</p> <p>9.6 Discuss the potential for icterus and bilirubin measurements as a diagnostic indicator of liver disorder.</p> <p>9.7 List and describe the tests most commonly utilized in the biochemical assessment of liver function.</p> <p>9.8 Describe the biochemical impact of a variety of biliary tract/liver dysfunctions.</p>
<b>Ends in View</b>	<b>Process</b>

	<p>10. Musculoskeletal and Nervous System Disorders.</p> <p>10.1 Discuss the relevant pathophysiology underlying a variety of metabolic bone diseases and articular diseases.</p> <p>10.2 Describe the relevant biochemical indicators of bone and arthritic conditions and the usefulness of Discuss the relevant pathophysiology underlying a variety of muscle diseases.</p> <p>10.3 Describe the relevant biochemical indicators of muscle conditions and the usefulness of the clinical lab in the diagnosis of these conditions.</p> <p>10.4 Discuss the relevant pathophysiology underlying a variety of nervous system disorders.</p> <p>10.5 Discuss the biochemical investigations that are commonly employed in the detection and management of a variety of nervous system disorders.</p>																					
<p><b>Evaluation Process and Grading System:</b></p>	<table><tr><th>Evaluation Type</th><th>Evaluation Weight</th><th>Course Outcome Assessed</th></tr><tr><td>Case study</td><td>10%</td><td>1-10</td></tr><tr><td>Final Exam</td><td>35%</td><td>6-10</td></tr><tr><td>Midterm</td><td>25%</td><td>1-5</td></tr><tr><td>Term test 1</td><td>10%</td><td></td></tr><tr><td>Term test 2</td><td>10%</td><td></td></tr><tr><td>Term test 3</td><td>10%</td><td></td></tr></table>	Evaluation Type	Evaluation Weight	Course Outcome Assessed	Case study	10%	1-10	Final Exam	35%	6-10	Midterm	25%	1-5	Term test 1	10%		Term test 2	10%		Term test 3	10%	
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	<p>Please refer to the course outline addendum on the Learning Management System for further information.</p>																					