



COLLEGE OF MEDICAL LABORATORY TECHNOLOGISTS OF MANITOBA

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Medical Laboratory Science Refresher Course List

Approved: December 2010

Courses on this list are approved for members that are eligible to practice in any of the following specialties:

- Biochemistry
- Hematology
- Histology
- Phlebotomy
- Microbiology
- Transfusion Science

Please note: This list is a summary of course information. Applicants should contact the institution offering the course(s) for the most up-to-date detailed information/registration protocols. All courses listed are available by distance education.

All refresher/update courses must have an evaluation component. The transcript **MUST** state the number of course hours.

Other courses will be considered for approval by the Board of Assessors when a request and the course outline are submitted to the CMLTM.

Contents

CHEMISTRY	2
MICROBIOLOGY	4
HEMATOLOGY	6
HISTOTECHNOLOGY	9
TRANSFUSION SCIENCE/IMMUNOHEMATOLOGY	10

CHEMISTRY

Institution	Outline	Duration	Cost
British Columbia Society of Laboratory Science www.bcsls.net	Back to Basics: Chemistry Module Electrolytes and Glucose Acid-Base Lipids & Toxicology Renal Function QA & Analytical Techniques Enzymology 20 hours, 10 DVDs, 1.5 hour exam	Continuous registration	MLT Provincial Society member: \$295.00 Non-member: \$385.00
British Columbia Society of Laboratory Science www.bcsls.net	Back to Basics: Chemistry & Hematology Joint Modules 32 hours, 16 DVDs, 2.5 hour exam		MLT Provincial Society member: \$415.00 Non-member: \$540.00
The Michener Institute www.michener.ca	CC859 Tutorials in Clinical Chemistry I An excellent review of several basic clinical chemistry topics in the CSMLS competency profile, this correspondence course addresses: Proteins and electrophoresis Liver function and enzyme testing Renal function and urinalysis testing Carbohydrates and lipid testing Acid-base and electrolyte balance testing Assignments plus exam NOTED: CC859 replaces the former distance education course CC902. Students who have received credit for CC902 cannot receive credit for CC859.	Continuous intake	\$349.00
The Michener Institute www.michener.ca	CC860 Tutorials in Clinical Chemistry II An excellent review of several clinical chemistry topics in the Medical Laboratory Technology CSMLS competency profile, this correspondence course addresses: Hormones and pituitary function Endocrinology, including: adrenal and thyroid function Parathyroid function and calcium metabolism Therapeutic drug monitoring Toxicology testing Evaluation includes assignment and final written examination.	Continuous intake	\$349.00

Institution	Outline	Duration	Cost
The Michener Institute www.michener.ca	CC861 Tutorials in Clinical Chemistry III An excellent review of several advanced chemistry topics in the Medical Laboratory CSMLS competency profile, this correspondence course addresses: Photometric measuring systems (including spectrophotometry, atomic absorption photometry, flame photometry, nephelometry, turbidimetry) Electrochemical measuring systems (including ion selective electrodes, potentiometric, polarographic, amperometric, and coulometric measurement) Partition and absorption chromatography Electrophoresis and osmometry Immunoassays Evaluation includes assignments and final written examination.	Continuous intake	\$349.00
Northern Alberta Institute of Technology www.nait.ca/course/ML834.asp For registration information, call 780-378-5000 or healthdistance@nait.ca	ML834 Clinical Chemistry II (Home study) Increase your knowledge of ability to use the lessons of clinical chemistry. In this second level course you'll continue studying the various chemical constituents of body fluids based on structure, function and metabolism. The specific focus of the course is on lipids, proteins, electrolytes and acid-base balance, toxicology and endocrinology	Continuous registration 50 hours	\$245.00 + text
Northern Alberta Institute of Technology www.nait.ca/course/ML834.asp For registration information, call 780-378-5000 or healthdistance@nait.ca	ML205 Urinalysis (Home study) This course presents the theory and techniques for chemical testing, microscopic examination and evaluation of physical properties of urine. Correct use and care of the microscope, quality control of procedures, correlation and clinical significance of results are discussed. The last unit covers occult blood and pregnancy screening tests.	Continuous registration 20 hours	\$245.00 + text
Southern Alberta Institute of Technology www.sait.ca/pages/cometo_sait/continuingeducation/index.shtml 1-877-284-7248 or 403-210-4210	CHEM-353 Clinical Chemistry Theory Refresher Get back to the basics of metabolism and function of carbohydrates, proteins, lipids, electrolytes and enzymes present in serum, urine, and other body fluids. An emphasis is placed on the clinical significance in relation to abnormal amounts in disease states. Modules plus examination	Continuous registration 80 hours/38 weeks	\$360.00 + materials + text

MICROBIOLOGY

Institution	Outline	Duration	Cost
<p>The Michener Institute www.michener.ca</p>	<p>MI905 Tutorials in Microbiology Designed for technologists seeking microbiology certification and those working in a multidisciplinary environment, this correspondence course provides a comprehensive review of medical microbiology. Course objectives:</p> <ul style="list-style-type: none"> • Identify commonly isolated bacterial pathogens found in the majority of clinical specimens • Review basic microbiological and bacterial physiology • Understand the theory and use of gram staining • Discuss the correct use of various media • Differentiate and identify commonly isolated bacterial pathogens <p>Assignments plus final examination</p>	<p>Continuous intake</p>	<p>\$549.00</p>
<p>Southern Alberta Institute of Technology www.sait.ca/pages/cometo_sait/continuingeducation/index.shtml 1-877-284-7248 or 403-210-4210</p>	<p>MBIO-316 Clinical Microbiology Theory Refresher This course reviews the basic concepts of bacterial anatomy and physiology followed by detailed methods of staining and identification by culture. Areas of clinical significance studied are: normal flora and the most common pathogens isolated from the urogenital tract, respiratory tract, gastrointestinal tract, eye/ear, cardiovascular and central nervous systems, and skin/wound/soft tissue sites. Emphasis will be on isolation and identification of clinically significant microorganisms. There will also be an introduction to mycology, parasitology, and antimicrobial susceptibility testing including the spectrum of the major drug groups and their pathophysiology; commonly isolated anaerobes and their clinical significance; and miscellaneous uncommon pathogens and their clinical significance. Modules plus examination.</p>	<p>Continuous registration Sept-Dec 2009 88 hours/32 weeks</p>	<p>\$380.00 + materials + S&H</p>

Institution	Outline	Duration	Cost
University of Waterloo <u>de.uwaterloo.ca</u> <u>distance@uwaterloo.ca</u>	BIOL 140 Fundamentals of Microbiology Introduction to the biology of bacterial and archaeal organisms. Cell structure and function, methods of cultivation, genetics, phylogeny and taxonomy, and metabolic and genetic diversity. Online study. Course work: 40%, Exams: 60%	Half credit Sept-Dec Jan-Apr	

HEMATOLOGY

Institution	Outline	Duration	Cost
British Columbia Society of Laboratory Science www.bcsls.net	Back to Basics: Hematology Module White Blood Cells Red Blood Cells Coagulation Body Fluids Platelets and Miscellaneous Tests Quality Assurance 20 hours, 10 DVDs. 1.5 hour exam	Continuous registration	MLT Provincial Society member: \$295.00 Non-member: \$385.00
British Columbia Society of Laboratory Science www.bcsls.net	Back to Basics: Chemistry & Hematology Joint Modules 32 hours, 16 DVDs, 2.5 hour exam	Continuous registration	MLT Provincial Society member: \$415.00 Non-member: \$540.00
CSMLS www.csmls.org	Refresher Course in Hematology 4193-08 F or 4193-08 S Course Objectives: <ul style="list-style-type: none"> • Basic hematology knowledge of test results and their implications; • Blood formation and the role of proliferation and differentiation of hematopoietic stem cells and extramedullary hematopoiesis • Normal ranges of each component of the complete blood count (CBC) and indices (RBC, MCV, MCHC) and relate to critical values • Preparation and systematic examination of manual differentials and relate to automated differentials • White blood cell and red blood cell morphology and relate to disease states • Clinical significance of analyses such as serum iron, TIBC, ferritin, haptoglobins, hemopaxin, methemalbumin, sickle cell solubility and reticulocyte count • Anemias including macrocytic, megaloblastic, aplastic, macrocytic hypochromic, iron deficiency, chronic disease, and sideroblastic • Hemoglobinopathies including the thalassemias and abnormal hemoglobins • Red cell membrane disorders and red cell enzyme defects • Myeloproliferative and lymphoproliferative disorders, 	Begins September and March 5 months	Members: \$300 + \$123.26 materials Non-members: \$450 + \$123.26 materials

	<p>myelodysplastic syndromes and the different leukemias</p> <ul style="list-style-type: none"> • Understand basic coagulation concepts and testing <p>5 assignments and a final examination</p> <p>A CD drive is required to view images</p>		
<p>Northern Alberta Institute of Technology</p> <p>www.nait.ca/courseML839.asp</p> <p>For registration information, call 780-378-5000 or healthdistance@nait.ca</p>	<p>ML839 Clinical Hematology – Normal Hematology (Homestudy)</p> <p>Unit 1: Blood Smear Evaluation – the examination and evaluation of mature blood cells on correctly prepared and stained peripheral blood smears.</p> <p>Unit 2: Counting and Analyzing Blood Cells – the counting of blood cells using manual techniques and using automated techniques (a multiparameter hematology analyzer with 3-part differential capabilities).</p> <p>Unit 3: Manual Laboratory Techniques – the erythrocyte sedimentation rate (ESR), the cyanmethemoglobin principle, and the manual microhematocrit method.</p> <p>Unit 4: Blood Cell Production and Blood Cell Functions – the stages of maturation of the normal blood cells and the major function of the mature leukocytes, erythrocytes and platelets.</p>	<p>Continuous registration</p> <p>30 hours</p>	<p>\$245.00 + text</p>
<p>Northern Alberta Institute of Technology</p> <p>www.nait.ca/courseML841.asp</p> <p>For registration information, call 780-378-5000 or healthdistance@nait.ca</p>	<p>ML841 Clinical Hematology – Erythrocyte Disorders (Homestudy)</p> <p>This course consists of three units:</p> <p>Unit 1: Reticulocyte Counting: Methods and Maturation</p> <p>Unit 2: Erythrocytes: Production and Destruction</p> <p>Unit 3: Pathophysiology and Laboratory Findings in Anemia</p>	<p>Continuous registration</p> <p>30 hours</p>	<p>\$245.00 + text</p>
<p>Northern Alberta Institute of Technology</p> <p>www.nait.ca/courseML843.asp</p> <p>For registration information, call 780-378-5000 or healthdistance@nait.ca</p>	<p>ML843 Clinical Hematology – Leukocyte Disorders (Homestudy)</p> <p>Unit 1: Blood Cell development</p> <p>Unit 2: Bone Marrow Evaluation</p> <p>Unit 3: Chronic Malignant Blood Disorders</p> <p>Unit 4: Acute Leukemias</p> <p>Unit 5: Myelodysplastic Syndromes</p> <p>Unit 6: Systematic Evaluation of Leukocyte Abnormalities</p>	<p>Continuous registration</p> <p>30 hours</p>	<p>\$245.00 + text</p>

Institution	Outline	Duration	Cost
<p>Northern Alberta Institute of Technology</p> <p>www.nait.ca/courseML845.asp</p> <p>For registration information, call 780-378-5000 or healthdistance@nait.ca</p>	<p>ML845 Clinical Hematology – Hemostasis (Homestudy)</p> <p>Unit 1: Basic Concepts of Coagulation – covers the cascade theory of coagulation, introduces the theory of clot lysis, and discusses the prothrombin time test and the activated partial thromboplastin time test</p> <p>Unit 2: Monitoring Thrombosis Therapy – discusses some disorders that may lead to thrombosis and the monitoring of heparin therapy using the APTT test and the monitoring of oral anticoagulant therapy using the prothrombin time test.</p> <p>Unit 3: Bleeding Disorders of Coagulation – briefly covers the inherited and acquired bleeding disorders of coagulation.</p> <p>Unit 4: Basic Concepts of Fibrinolysis – outlines the activation of the fibrinolytic system, differentiates primary and secondary fibrinolysis, and briefly discusses laboratory tests that are used to detect fibrinolysis</p> <p>Unit 5: Platelets – Their Function in Hemostasis – the importance of platelets in Hemostasis</p> <p>Unit 6: Special Coagulation Tests – some special coagulation tests (inhibitor studies and factor assays) that will identify coagulation factor deficiencies or abnormalities.</p>	<p>Continuous registration</p> <p>30 hours</p>	<p>\$245.00 + text</p>
<p>Southern Alberta Institute of Technology</p> <p>www.sait.ca/pages/cometosait/coursefinder/coned.shtml</p> <p>1-877-284-7248 or 403-210-4210</p>	<p>HEMA-301 Hematology Theory Refresher</p> <p>This course includes an introduction to the composition and function of blood cells, hematopoiesis, erythrocyte and leukocyte metabolism, production and destruction, classification of anemias and leukemias, etiology and laboratory findings. Various mechanisms involving blood clotting in normal versus abnormal patients with hemorrhagic or thrombotic diseases are also studied.</p> <p>13 modules and four examinations</p>	<p>Continuous registration</p> <p>Sept-Dec 2009</p> <p>80 hours/38 weeks</p>	<p>\$360.00 + text</p>

HISTOTECHNOLOGY

Institution	Outline	Duration	Cost
<p>CSMLS www.csmls.org</p>	<p>Paraffin Tissue Processing 9822-08 Meticulous embedding of tissues ensures sections are accurate representations and directly impacts the examination and interpretation of specimens. You will review the basics on the theory and mechanisms of paraffin tissue processing, including dehydration, clearing, infiltration, decalcification and general processing. Improve your problem solving skills as you learn to detect and correct processing errors and deal with disposal of clearing agents and hazards of clearing agents.</p>	<p>Continuous registration. Work at your own pace; must complete course within 12 months of registration.</p>	<p>Member: \$70.00 Non-member: \$105.00</p>
<p>The Michener Institute www.michener.ca</p>	<p>H1901 Tutorials in Histology An excellent review of all aspects of histotechnology theory, this course covers:</p> <ul style="list-style-type: none"> • Microanatomy • Routine tissue preparation techniques • General principles of staining • Special techniques and staining methods <p>Assignments plus examination</p>	<p>Continuous intake</p>	<p>\$549.00 (includes CD)</p>
<p>Southern Alberta Institute of Technology www.sait.ca/pages/xometo_sait/coursefinder/coned.shtml 1-877-284-7248 or 403-210-4210</p>	<p>MEDL-366 Histology Refresher Reinforce your knowledge of preparation of tissue sections including gross dissection, fixation, decalcification, processing, embedding, microtomy and cryotomy, general staining techniques. In addition, functional classification of cells and tissue arrangements followed by microanatomy of major organs will be covered. Modules plus examinations.</p>	<p>Continuous registration 48 hours/26 weeks</p>	<p>\$290.00 + materials</p>

TRANSFUSION SCIENCE/IMMUNOHEMATOLOGY

Institution	Outline	Duration	Cost
<p>CSMLS www.csmls.org</p>	<p>Transfusion Medicine Refresher Course 4336-07F and 4336-07S</p> <p>Basic level. Upon successful completion of the requirements of this course you will be able to:</p> <ul style="list-style-type: none"> • Describe a self-directed learning project, thereby relating to other independent learning situations • Define transfusion medicine • Define primary and secondary immunization • Differentiate between humoral and cellular immunity • Recognize functions of T cells and B cells • Use terminology relating to immunoglobulin structure and function • Employ basic factual information about the immune system • Explain environmental conditions necessary for a successful antigen-antibody reaction in anti-human globulin testing • Apply the principles of anti-human globulin testing to antibody detection problems • Differentiate between methods of antibody detection • Apply basic genetic principles to the ABO system • Interpret normal and abnormal ABO and Rh testing results • Compare blood group system characteristics for systems • Explain commonly required antibody investigation techniques • Identify critical steps in investigation of a suspected haemolytic transfusion reaction • Explain adverse effects of transfusion • List transmissible disease testing requirements for blood donations • Identify the types of laboratory errors used in a standardized error reporting system • Identify aspects of transfusion medicine as it relates to hemolytic disease of the newborn • Describe investigation techniques for autoimmune hemolytic anemia 	<p>Begins March and October</p> <p>Four months</p>	<p>Members: \$350.00 Non-members: \$525.00 Textbook: \$70.16</p>

	<ul style="list-style-type: none"> • Describe mechanisms of drug-induced hemolytic anemia • Identify criteria for selection of suitable blood donors • List and explain the characteristics of blood components and blood products available from the blood supplier • Indicate the storage requirements and expiry dates for red blood cells, platelets and plasma components <p>Ten assignments and a final exam. Access to a computer and the internet is required because Turnitin.com is used for submitting assignments and emailing with your instructor</p>		
<p>The Michener Institute www.michener.ca</p>	<p>IH603 Compatibility Testing and Antibody Investigation This print-based review course is designed for Medical Laboratory Technologists preparing for national certification or cross-training in Transfusion Medicine.</p> <ul style="list-style-type: none"> • Review procedures for compatibility testing and collection of specimens • Discuss methodology, selection, and issuing of compatible units • Discover techniques for antibody classification • Improve your detection, identification, and resolution of difficulties encountered in compatibility testing <p>Case studies are used to review the exclusion process and to illustrate problems, plus final exam.</p>	Continuous intake	\$499 (including cost of materials)
<p>The Michener Institute www.michener.ca</p>	<p>IH816 Transfusion Science Review Review the essential aspects of transfusion science, including: Immunoglobulins; complement; immune response; antiglobulin test; crossmatching; blood components; antibody detection and identification; autoimmune hemolytic anemia; blood groups & components; autoimmune hemolytic anemia; and adverse effects of transfusion. Self-study course with tutor support. Research will be done using mainly the Internet. Good computer skills required. Six assignments plus examination.</p>	Online course Continuous intake	\$549.00

Institution	Outline	Duration	Cost
<p>The Michener Institute www.michener.ca</p>	<p>IH903 Transfusion Science This recently revised course re-acquaints the Medical Laboratory Technologist with a variety of Transfusion Science topics, including Blood Components. This course is designed for technologists cross-training into a Transfusion Science laboratory, or preparing for National (CSMLS) certification exams. This correspondence course consists of a comprehensive package of self-study notes, covering all aspects of Transfusion Science theory including: Immunology; Major blood group systems; Antibody investigation; Compatibility testing; Blood component therapy; Transfusion hazards; Quality control; Hemolytic disorders (HDN, WAIHA, CHD, DIHA)</p> <p>To complete some modules, you will need access to the internet.</p> <p>Graded assignments plus examination.</p>	<p>Continuous intake</p>	<p>\$549.00 (includes cost of videotaped lectures on CD and self-study notes)</p>
<p>Southern Alberta Institute of Technology www.sait.ca/pages/cometosait/coursefinder/coned.shtml or 403-210-4210</p>	<p>MEDL-360 Transfusion Medicine Theory Refresher This course will provide the theory required to perform basic techniques to detect antigen-antibody reactions, to perform ABO forward and reverse grouping and Rh phenotyping, as well as to perform antiglobulin testing (direct and indirect). Topics covered will also include how to problem-solve ABO discrepancies and a discussion on quality systems implemented in the blood bank.</p> <p>16 lecture modules + 2 lab modules 3 examinations</p>	<p>Continuous registration 48 hours/26 weeks</p>	<p>\$290.00 + text</p>