





GENETICS REFRESHER COURSE LIST

Courses on this list are approved for registrants and applicants who are eligible to practice in clinical genetics.

Please note: This list is a summary of course information. Registrants or applicants should contact the institution offering the course for the most up-to-date detailed information/registration protocols and fees. Other courses will be considered for approval by the Registration Committee when a request and the course outline are submitted to the CMLTO. All refresher/updating courses must have an evaluation component and the transcript **MUST** state the number of hours in the course.



The required number of refresher course hours depends on the number of years a registrant or applicant has been away from the medical laboratory technology profession. To meet the required total hours of courses, one may refer to the MEDICAL LABORATORY SCIENCE REFRESHER COURSE LIST for additional courses that are applicable to one's practice. For more information, please contact the CMLTO Registration Department by email at registration@cmlto.com or by telephone at 1-800-323-9672 ext. 1.


Distance Education courses identified by  1 PEP hr = 1 refresher course hr 1 CEU hr = 10 refresher course hrs

Institution	Outline	Prerequisites/More Info	Duration/Fee
Athabasca University	<p>BIOL 341 HUMAN GENETICS</p> <p>This course introduces you to the laws of heredity as they apply to humans and to the study of inherited traits. The course covers a number of other related topics, including sex determination, the composition and function of genes, the causes and effects of mutation, population genetics, the genetics of immunity and cancer, the contribution of heredity to behaviour and intelligence, genetic counselling, and genetic technologies.</p>	<p>Course information</p> <p>BIOL 204 Principles of Biology I and BIOL 205 Principles of Biology II or BIOL207 or equivalent.</p>	<p>3.0 credits.</p> <p>Fee Summary </p>

<p>Brock University</p>	<p>BIOL 4P41 HUMAN MOLECULAR GENETICS Principles of human genetics, human genome organization, pedigree, disease gene mapping, forensic and cancer genetics, genome sequencing, personal genomics.</p>	<p>Course Catalog BIOL 3P50 or 3P51. Restriction: students must have a minimum of 14.0 overall credits or approval to year 4 (honours).</p>	<p>Lectures/seminars, 3 hrs/wk Tuition and Fees Overview</p>
<p>Carleton University</p>	<p>BIOL 2104 INTRODUCTORY GENETICS A lecture and laboratory course on the mechanisms of inheritance and the nature of gene structure, composition and function. It introduces both classical Mendelian genetics and modern molecular genetics. It is strongly recommended that this course be taken by Biology majors in their second year of study.</p>	<p>Course Catalog BIOL1003and BIOL 1004, or (BIOL 1103 and BIOL 1104) or permission of the department.</p>	<p>3 hrs lecture/wk + 3 hrs lab or tutorial/wk half-credit Tuition Fees</p>
<p>Carleton University</p>	<p>BIOL 2107 FUNDAMENTALS OF GENETICS Mechanisms of inheritance and the nature of gene structure, composition and function, introducing both classical Mendelian genetics and modern molecular genetics.</p>	<p>Course Catalog (BIOL 1003 and BIOL 1004), (BIOL 1103 and BIOL 1104) or permission of the Department.</p>	<p>3 hrs lectures/wk half-credit Tuition Fees</p>
<p>Carleton University</p>	<p>BIOL 3104 MOLECULAR GENETICS A lecture course dealing with modern advances in molecular genetics.</p>	<p>Course Catalog BIOL 2104 Introductory Genetics or BIOL 2107 or permission of the Department.</p>	<p>3 hrs lectures/wk half-credit Tuition Fees</p>

Carleton University	BIOL 4103 POPULATION GENETICS Evolution of gene frequencies, including selection, mutation, genetic drift, inbreeding, gene flow, and population structure.	Course Catalog BIOL 2104 or BIOL 2107 or permission of the Dept. A course in statistics is highly recommended.	3 hrs lectures +seminar/wk half-credit Tuition Fees
Carleton University	BIOL 4104 EVOLUTIONARY GENETICS An overview of the molecular evidence of evolution, speciation as well as the phylogenetic analysis of biological sequence data and biometrical traits. Includes: Experiential Learning Activity	Course Catalog BIOL 2001 or BIOL 2002 and BIOL 2104 or BIOL 2107 or by permission of the Dept. A course in statistics is highly	lectures/computer lab 3 hrs/wk half-credit Tuition Fees
Carleton University	BIOL 4106 ADVANCES IN MOLECULAR BIOLOGY Review of the application of high throughput approaches to research in molecular and cellular biology and biochemistry with an emphasis on gene human disease progression.	Course Catalog BIOL 2303 and (BIOL 3104 or BIOL 3201)	lectures/seminars 3 hrs/wk half- credit Tuition Fees
Carleton University	BIOL 4109 LABORATORY TECHNIQUES IN MOLECULAR GENETICS This laboratory course provides practical familiarity with commonly used techniques in molecular genetics. The laboratory is suitable for students with a developing interest in problems of molecular and cellular biology biochemistry. Includes: Experiential Learning Activity	Course Catalog BIOL 2200/BIOC 2200 Cellular Biochemistry and BIOL 2303 Microbiology, and BIOL 3104 Molecular Genetics, or by permission of the Department	6 lecture/lab a week in two sessions half- credit Tuition Fees
Lakehead University	BIOL2171 GENETICS An introduction to the principles of inheritance, modern gene concepts and basic population genetics presented in a lecture, lab, and problem-solving format.	Course Catalog	lecture 3-3; 3-3 half-credit Student Fees Information


<p>Lakehead University</p>	<p>BIOLOGY 3135 MOLECULAR GENETICS Isolation and identification of genes, analysis of gene structure, gene expression and its regulation, with emphasis on molecular genetics of prokaryotic microorganisms and their viruses. Major topics covered include: mutagenesis, conjugation, recombination, gene regulation, plasmids, transposons, bacteriophage and genomics.</p>	<p>Course Catalog Applied Bio-Molecular Science 3135 Biology 2910 or Biology 3352/Chemistry 3251, Biology 2171, 2230, and 2711; or permission of the instructor</p>	<p>3 lecture/3 labs 3-3; 0-0 half-credit Student Fees Information</p>
<p>Laurentian University Dept. of Biology Courses</p>	<p>BIOL-2007EL GENETICS This course introduces Mendelian inheritance, chromosomes, and the chemical basis of heredity, linkage, and crossing over. Topics include variations in chromosome structure and number, mutation, the structure and function of genes, and the use of statistics in the genetic analysis of quantitative characters.</p>	<p>BIOL 1506/1507. Students may not retain credit for both BIOL 2007 and either BIOL 2011 or BIOL 3017.</p>	<p>3 credits Fees and Financing  Check for availability</p>
<p>Laurentian University Dept. of Biology Courses</p>	<p>BIOL-2011EL 10 FUNDAMENTALS OF GENETICS This course deals with the replication, modification, transmission and function of the genetic information in living organisms.</p>	<p>BIOL 1506 Biology I; OAC Chemistry, CHMI 1030/1032 or 1041. Credit cannot be retained for both BIOL 2011 and 3017. Not available for credit in the Bachelor of Science programs in Biology.</p>	<p>3 credits Fees and Financing  Check for availability</p>

		Course Information	
<p>University of Waterloo</p> <p>Dept. of Biology</p>	<p>BIOL 239 GENETICS (FORMERLY BIOL 139) Mendelian genetics. Chromosomal mechanisms in mitosis and meiosis. The origin, inheritance and adaptive significance of chromosomal changes. Nucleic acids as the carriers of genetic information. Natural selection and the evolution of genetic systems.</p>	<p>Course Catalog</p>	<p>3 lecture, 1 tutorial half-credit</p> <p>Tuition Fee Schedules </p>
<p>University of Waterloo</p> <p>Dept. of Biology</p>	<p>BIOL 342 MOLECULAR BIOTECHNOLOGY 1 Molecular biotechnology applies the principles of recombinant DNA technology (genetic engineering, cloning) to the development of commercial products. The methods of recombinant DNA technology, molecular diagnostic systems for detecting diseases and organisms will be discussed.</p>	<p>BIOL 140/240 and BIOL 208/309 or 330 Recommended: BIOL 241</p> <p>Course Catalog</p>	<p>Lecture, tutorial half-credit</p> <p>Tuition Fee Schedules</p>
<p>University of Waterloo</p> <p>Dept. of Biology</p>	<p>BIOL 432 MOLECULAR BIOTECHNOLOGY 2 How recombinant DNA technology is used to produce vaccines, plant growth promoting bacteria, pharmaceuticals, crop plants and other commercial products will be discussed.</p>	<p>BIOL 342 Molecular Biotechnology 1</p> <p>Course Catalog</p>	<p>Lecture, TST half-credit</p> <p>Tuition Fee Schedules</p>
<p>University of Waterloo</p> <p>Dept. of Biology</p>	<p>BIOL 434 HUMAN MOLECULAR GENETICS Recent advances in human molecular genetics will be examined with emphasis on how human disease-causing genes are mapped, identified, isolated and characterized. Examples will draw from research on Duchenne muscular dystrophy, Huntington disease, cystic fibrosis, Alzheimer disease, cancer, vision defects and other disorders.</p>	<p>BIOL 208/309 , and BIOL 308</p> <p>Course Catalog</p>	<p>Lecture, seminar half-credit</p> <p>Tuition Fee Schedules</p>

<p>University of Western Ontario</p> <p>Dept. of Biology</p>	<p>BIOLOGY 2382B CELL BIOLOGY</p> <p>Molecular and structural organization of cells in relation to function. Composition and dynamics of the plasma membrane and membrane-bound compartments in cells. Cytoskeleton and cell motility. Membrane receptors in signal and energy transduction, cell-cell adhesion and recognition. Excitable membranes.</p>	<p>BIO 1001A or 1201A and BIO 1002B or 1202B, CHEM 1301A/B and CHEM 1302A/B or former CHEM 1010A/B and CHEM 1200B</p> <p>Course Catalog</p>	<p>2 lecture, 1 lecture/tutorial half-course</p> <p>Program and Per Course Fee Information</p>
<p>University of Western Ontario</p> <p>Dept. of Biology</p>	<p>BIOLOGY 2581B GENETICS</p> <p>The structure, transmission and expression of genetic elements in prokaryotic and eukaryotic organisms and populations.</p>	<p>BIO 1001A or 1201A and BIO 1002B or 1202B OR Integrated Science 1001X; Biochemistry 2280A.</p> <p>Course Catalog</p>	<p>2 lecture and 1 lecture/tutorial half-course</p> <p>Program and Per Course Fee Information</p>
<p>University of Western Ontario</p> <p>Dept. of Biology</p>	<p>BIOLOGY 3592A PRINCIPLES OF HUMAN GENETICS</p> <p>Genetic principles and their application to humans. Special attention will be directed to the genetic variation in our species, mutations, mechanisms of gene expression and mapping the human genome.</p>	<p>Biochemistry 2280A; Biology 2581A/B</p> <p>Course Catalog</p>	<p>2 lecture, 1 lecture/tutorial half-course</p> <p>Program and Per Course Fee Information</p>
<p>University of Western Ontario</p> <p>Dept. of Biology</p>	<p>BIOLOGY 3593B GENETIC ENGINEERING</p> <p>An accounting of the principles in Genetics that have led to advances in animal and plant breeding earlier in this century; recombinant DNA and other technologies employed in contemporary biotechnology; and the basis for continued progress in genetic engineering.</p>	<p>Biochemistry 2280A; Biology 2581A/B</p> <p>Course Catalog</p>	<p>2 lecture, 1 lecture/tutorial half-course</p> <p>Program and Per Course Fee Information</p>
<p>University of Western Ontario</p> <p>Dept. of Biology</p>	<p>BIOLOGY 3597A REGULATION OF GENE EXPRESSION</p> <p>A discussion of the genetic material and molecular mechanisms governing its expression in a variety of organisms.</p>	<p>Biochemistry 2280A; Biology 2581A/B</p> <p>Course Catalog</p>	<p>2 lecture, 1 lecture/tutorial half-course</p> <p>Program and Per Course Fee Information</p>

<p>University of Western Ontario</p> <p>Dept. of Biology</p>	<p>BIOLOGY 4560B HUMAN MOLECULAR GENETICS</p> <p>This course will offer an up-to-date examination of the current status of human genetics with emphasis on the molecular information. The specific course content is expected to change from year to year reflecting research progress, including the human genome project.</p>	<p>Biology 3592A and 3596A/B; one additional 0.5 course in Biology at the 3000 level or above; and registration in year 4 of an Honors Specialization module offered through the Dept. of Biology or a Major in Genetics</p> <p>Course Catalog</p>	<p>2 lecture half-course</p> <p>Program and Per Course Fee Information</p>
<p>University of Western Ontario</p> <p>Dept. of Biology</p>	<p>BIOLOGY 4562A GENES AND GENOMES II</p> <p>An examination of our current understanding of the organization, structure and function of the genes and genomes of plants, emphasizing recent developments in plant molecular genetics involving model organisms. Topics include plant gene expression, mapping of plant genes, molecular tools for DNA transfer, the interrelationship of nuclear, mitochondrial, and chloroplast genes.</p>	<p>Completion of at least 1.5 biology courses at 3000 level or above; and registration in year 4 of an Honours Specialization module or a Major in Genetics offered through the Dept. of Biology; or permission of the instructor</p> <p>Course Catalog</p>	<p>2 lecture half-course</p> <p>Program and Per Course Fee Information</p>
<p>University of Western Ontario</p> <p>Dept. of Biology</p>	<p>BIOLOGY 4950F/G SEMINAR IN GENETICS</p> <p>Current research in genetics critically reviewed and discussed through a combination of student presentations and written assignments</p>	<p>A minimum grade of 70% in Biology 3596A/B and enrolment in year 4 of the Honors Specialization in Genetics, or permission of the Genetics Undergraduate Coordinator</p> <p>Course Catalog</p>	<p>3 lecture/tutorial hours half course</p> <p>Program and Per Course Fee Information</p>

<p>University of Western Ontario</p> <p>Dept. of Biochemistry</p>	<p>BIOCHEMISTRY 2280A BIOCHEMISTRY AND MOLECULAR BIOLOGY</p> <p>An introduction to biochemistry with emphasis on protein structure and function, intermediary metabolism and nucleic acid structure and function.</p>	<p>Either Biology 1001A or 1201A and either Biology 1002B or 1202B; AND Chem 301A/B and 1302A/B</p> <p>Course Catalog</p>	<p>3 lecture half-course</p> <p>Program and Per Course Fee Information</p>
<p>University of Western Ontario</p> <p>Dept. of Biochemistry</p>	<p>BIOCHEMISTRY 3381A BIOLOGICAL MACROMOLECULES</p> <p>A consideration of the structure of proteins and nucleic acids; enzymology; elements of recombinant DNA technology and related methodology. Areas covered will include the biogenesis of proteins and nucleic acids, a consideration of their nature from both chemical and structural viewpoints, an examination of experimental techniques useful for their characterization and analysis, and a kinetic and mechanistic overview of enzymic catalysis.</p>	<p>A minimum mark of 65% in either Biochemistry 2280A or 2288A; a minimum mark of 60% in either Chemistry 2213A/B or 2273A; and a minimum mark of 60% in either Chemistry 2223B or 2283G.</p> <p>Course Catalog</p>	<p>3 lecture, 1 tutorial half-course</p> <p>Program and Per Course Fee Information</p>
<p>University of Western Ontario</p> <p>Dept. of Biochemistry</p>	<p>BIOCHEMISTRY 4410A MOLECULAR BIOLOGY OF DNA AND RNA</p> <p>The use of fundamental techniques in molecular biology and molecular genetics are illustrated using examples from the classic and current literature. Selected topics include eukaryotic gene and cloning, transgenic animals, rational drug design, DNA replication and cell cycle regulation.</p>	<p>Biochemistry 3381A and 3382B</p> <p>Course Catalog</p>	<p>2 lecture half-course</p> <p>Program and Per Course Fee Information</p>
<p>University of Western Ontario</p> <p>Dept. of Biochemistry</p>	<p>BIOCHEMISTRY 4420A MOLECULAR BIOLOGY OF PROTEINS</p> <p>Topics to be considered at an advanced level will include: protein folding, stability, dynamics and association with the membrane.</p>	<p>Biochemistry 3381A and Biochemistry 3382A</p> <p>Course Catalog</p>	<p>2 lecture, 1 tutorial half-course</p> <p>Program and Per Course Fee Information</p>

<p>University of Windsor</p> <p>Dept. of Biomedical Sciences</p>	<p>BIOM- 2093 GENETICS</p> <p>The course reviews transmission genetics and principles of inheritance. The material also includes non-nuclear inheritance and gene linkage, gene expression and regulation, mechanisms and phenotypic effects of DNA mutation and repair, and the principles and applications of population and quantitative genetics. Students will be exposed to molecular genetic techniques such as PCR and DNA sequencing.</p>	<p>BIOL-1111 and BIOL-1101</p> <p>Course search</p>	<p>FALL 3 lecture</p> <p>Fee Estimator</p>
<p>University of Windsor</p> <p>Dept. of Biomedical Sciences</p> <p>Course search</p>	<p>BIOM- 3500 MOLECULAR CELL BIOLOGY</p> <p>An integration of recent findings in molecular and cell biology with those in genomics. The course emphasizes the general behaviour of biological macromolecules and energy transfer mechanisms, leading to in-depth review of the regulation of genome replication and recombination, gene transcription, protein translation, and epigenetic mechanisms governing gene regulation.</p>	<p>BIOL 2111 BIOM 2131 or BIOM 2093 and BIOM 2033 with appropriate laboratory experience and signature of instructor.</p> <p>Course search</p>	<p>FALL 3 lecture</p> <p>Fee Estimator offered on-campus and as a distance course</p>
<p>University of Windsor</p> <p>Dept. of Biomedical Sciences</p>	<p>(BIOM- 4550 DEVELOPMENTAL SIGNALLING AND DEVELOPMENTAL GENETICS</p> <p>Analysis at the molecular level of the activation and control of genes and proteins during cogenesis and early development in lower and higher eukaryotes.</p>	<p>Any 2 courses chosen from BIOL-3500, BIOL-3530 or BIOL 3550</p> <p>Course search</p>	<p>3 lecture</p> <p>Fee Estimator</p>
<p>University of Windsor</p> <p>Course search</p>	<p>STAT- 2910 STATISTICS FOR THE SCIENCES</p> <p>This course will descriptive statistics, probability, discrete and continuous distributions, point and interval estimation, hypothesis testing, goodness-of-fit and contingency tables.</p>	<p>Prerequisite: Grade 12 “U” Advanced Level Mathematics (MHF4U, MCV4U, MDM4U) or Grade 11 Functions and Applications (MCF3M) or Grade 11 Functions (MCR3U).</p>	<p>3 lecture/1 tutorial</p> <p>Fee Estimator</p> 

<p>Wilfred Laurier University</p> <p>Dept of Biology</p>	<p>BI226 MOLECULAR BIOLOGY AND GENETICS</p> <p>Concepts and principles of transmission (Mendelian) genetics and population genetics, using analysis and interpretation of genetic examples and situations to illustrate how genes are inherited, the phenotypes and the effects of gene interactions. The underlying principles of genetics will be extended to a discussion of the flow of genetic information in the cell. Topics will include the molecular biology of DNA replication, transcription, and translation.</p>	<p>BI111</p> <p>Course information</p>	<p>3 lecture Half credit</p> <p>Tuition and Fees</p>
<p>Wilfred Laurier University</p> <p>Dept of Biology</p>	<p>BI236 CELL BIOLOGY</p> <p>An introduction to contemporary cell and molecular biology. Topics may include structure and function of cells, the cell cycle, molecular processes within cells including transcription and translation, aspects and molecular signaling, an introduction to developmental biology, current techniques in cell and molecular biology, and applications to biotechnology, medicine and other health-related sciences.</p>	<p>BI111</p> <p>Course information</p>	<p>3 lectures Half credit</p> <p>Tuition and Fees</p>
<p>York University</p> <p>Dept. of Biology</p>	<p>SC/BIOL 2040 Genetics</p> <p>A study of the organization and behaviour of genes and chromosomes and their roles in cells, organisms, populations and evolution.</p>	<p>SC/BIOL 1000 3.00 & SC/BIOL 1001 3.00 or SC/ISCI 1110 6.0, or both SC/ISCI 1101 3.0 & SC/ISCI 1102 3.00</p> <p>Course search</p>	<p>3 lecture hours 3.0 credits one term</p> <p>Course and Program Fees</p>
<p>York University</p> <p>Dept. of Biology</p>	<p>SC/BIOL 3130 Molecular Biology II: Regulation of Gene Expression</p> <p>Gene structure and function. Mechanisms of gene expression in prokaryotes and eukaryotes. Storage and retrieval of genetic information; transcription, translation and their control.</p>	<p>SC/BIOL 3110 3.00 or SC/BCHM 3110 3.00.</p> <p>Course search</p>	<p>3 lecture hours 3.0 credits one term</p> <p>Course and Program Fees</p>

<p>York University Dept. of Biology</p>	<p>SC/BIOL 3140 4.00 ADVANCED BIOCHEMISTRY AND MOLECULAR GENETICS LABORATORY Research techniques used in biochemistry and molecular biology, including recombinant DNA technology, are illustrated. Purification of a restriction endonuclease; isolation and mapping of bacterial plasmids, bacteriophage and recombinant molecules; polymerase chain reaction (PCR); nucleic acid hybridization.</p>	<p>Prerequisite or co-requisite: SC/BIOL 3110 3.00 or SC/BCHM 3110 3.00. SC/BIOL 3130 3.00 or SC/BCHM 3130 3.00 strongly recommended as a prerequisite or co-requisite. Course search</p>	<p>1 lecture, 6 lab two days/week, plus additional laboratory hours throughout the week. 4.0 credits One term Course and Program Fees</p>
<p>York University Dept. of Biology</p>	<p>SC/BIOL 4285 3.00 HUMAN MOLECULAR GENETICS The course covers the application of genetic and molecular biological techniques to study human diseases and other related areas, and discusses ethical that might arise from this research.</p>	<p>SC/BIOL 3130 3.00 Course search</p>	<p>3 lecture hours 3.0 credits one term Course and Program Fees</p>