

Project Report

Project Name: Medical Laboratory Services Program Redevelopment
Department: Program and Curriculum Development
Focus Area: Medical Laboratory Services Program, Allied Health Sciences Department, Applied Sciences Division
Product/Process: Update the program to meet new accreditation standards

Prepared By

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1 PROJECT REPORT PURPOSE

This report is the final document listing contributions by the Program and Curriculum Development Department toward redevelopment of the Medical Laboratory Sciences Program up to August 29, 2008. Further work on redevelopment of this program will be continued by faculty and staff of the Allied Health Sciences Department.

2 PROJECT REPORT GOALS

- Document progress on Medical Laboratory Sciences Program redevelopment to August 29, 2008.
 - Document the contribution made by the Program and Curriculum Development Department toward this program redevelopment
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3 PROJECT REPORT SUMMARY

3.1 Background Overview

Students entering the Medical Laboratory Sciences Program in the fall of 2008 will be tested against competencies established by the Canadian Society for Medical Laboratory Science (CSMLS) before they are allowed to practice when they graduate in 2010. This will be the first cohort of students to be tested against new and revised competencies that were recently mandated by CSMLS. This has necessitated a significant revision to the RRC Medical Laboratory Sciences program.

In January of 2007, the Dean of the Applied Sciences Division requested consulting assistance from the Program and Curriculum Development Department to revise the program. P&CD Curriculum Consultant Gene Semchych was assigned to this program revision/redevelopment project and has provided consulting assistance, from a quality assurance perspective, to it from September of 2006 to August of 2008. This report documents progress on this revision/redevelopment during this period.

3.2 Project Highlights and Best Practices

Project Highlights:

- An environmental scan was conducted during 2006-07 comparing the RRC program with similar programs at 9 other institutions across Canada. An analysis of this scan identified strength and weaknesses across programs that were used to inform the program revision/redevelopment process for the RRC program.
- A Graduate Profile, reflecting the new CSMLS competencies, was developed for the program. Using the new CSMLS competencies and the Graduate Profile, learning outcomes were developed for each course taught in the first-year (didactic year) of the program.
- The learning outcomes were mapped against the new CSMLS competencies to identify gaps and redundancies for the first-year (didactic year) of the program. The learning outcomes were then adjusted across first-year course to address identified gaps and redundancies.
- New course outlines for all first-year courses were developed.

Best Practices:

- Quality assurance requires that course development or revision be grounded upon a DACUM occupational analysis or external accreditation standards, and a Graduate Profile that has been developed based on accreditation standards or a DACUM occupational analysis.
- Course learning outcomes, and their assessment, must reflect the Graduate Profile.

3.3 Project Closure Synopsis

This report signifies project closure as far as the Program and Curriculum Development contribution is concerned.

It does not, however, signify an end to program redevelopment for the Medical Laboratory Sciences Program. The Program Chair and faculty will continue redevelopment of the second-year (clinical) portion of the program along with clinical partners.

4 PROJECT GOALS AND RESULTS

4.1 Goals

- To perform an Environmental Scan and Scan Analysis comparing the RRC program with similar programs across Canada. The purpose of this goal was to glean strengths and best practices from other similar programs and incorporate them into the RRC program.
- To develop a Graduate Profile for the revised RRC program reflection the new CSMLS competencies and information gleaned from the Environmental Scan and Scan Analysis.
- To write revised learning outcomes for all program courses based on the Graduate Profile.
- To map revised learning outcomes across all program courses against the new CSMLS competencies and identify gaps and redundancies.
- To address identified gaps and redundancies across program courses and develop revised course outlines for all courses in the program.

4.2 Results

Goals achieved:

- The Environmental Scan and Scan Analysis were completed in April of 2007. Results are provided in *Appendix 7.2* of this report.
- A Graduate Profile for the program was developed April 21, 2008 by faculty and the Program Chair in a session facilitated by the P&CD Curriculum Consultant. The Graduate Profile is provided in *Appendix 7.3* of this report.
- Learning outcomes were written for all first-year (didactic) courses April 22 and 23, 2008 faculty and the Program Chair in a session facilitated by the P&CD Curriculum Consultant.
- Revised, first-year, learning outcomes were mapped against CSMLS competencies by faculty and the Chair with assistance from the P&CD Curriculum Consultant during May through July of 2008. Gaps and redundancies were identified and addressed by the Chair and faculty.
- Revised course outlines for all first-year courses were written by faculty April 24 and 25, 2008 during a workshop facilitated by the P&CD Curriculum Consultant. The outlines were finalized by the faculty and Chair in August after the mapping process was completed and before the start of classes.

Goals not achieved

Learning outcomes, mapping, and course outline processes were not completed for the second-year (clinical) courses in the program. These processes will be completed over 2008-09 by the Program Chair, faculty, and clinical partners.

4.3 Resources Used

P&CD contribution:

- An external contractor performed the Environmental Scan and Scan Analysis at a cost of \$3,000.00.
- Approximately 50 days consultant time was contributed by P&CD between January 2, 2007 and September 8, 2008.

Allied Health Sciences Department Contribution:

- Approximately 4 days was contributed by each faculty member and the Program Chair to participate in workshops where the Graduate Profile, learning outcomes, and revised course outlines were developed.
 - An undetermined amount of time was contributed by each faculty in finalizing course outlines after the mapping process was completed.
 - An undetermined amount of time was contributed by the Program Chair and administrative Assistant in completing the mapping process.
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5 PROJECT CLOSURE

5.1 Quality Management

The project followed accepted Quality Management in Curriculum best practices used at RRC.

- An Environmental Scan was conducted and a Scan Analysis was made to inform program revision/redevelopment.
- A Graduate Profile was developed based on CSMLS national competencies (equivalent of a DACUM occupational analysis).
- Learning outcomes with assessment criteria were developed based on the Graduate Profile and CSMLS competencies.
- Learning outcomes were distributed to program courses using a program mapping process.
- Course outlines using the RRC Standardized Course Outline format were developed for each first-year (didactic) course.

5.2 Lessons Learned

The most significant lesson learned through this project was that the greatest progress occurred when faculty, and the Program Chair, met together to work on the Graduate Profile, learning outcomes, and course outlines. This enabled a coherent, program-level approach to revision and development. It also fostered a synergy where faculty could feed off of each others' energy, expertise, and knowledge.

In all, the faculty and Chair, facilitated by the Curriculum Consultant, met for approximately 4 days in total during this project.

5.3 Post-project Work

The Program Chair and faculty will need to continue the processes started in this project to complete revisions to the second year of the program.

Students spend nearly all of the second year of the program in clinical placements in a number of clinical institutions that are partners in the Medical Laboratory Sciences Program. They are expected to apply knowledge and skills learned in the first-year (didactic) part of the program and develop competencies to a level established by the CSMLS National Competencies.

Learning outcomes, related assessment, and course outlines will need to be developed for all second-year (clinical) courses based on the Graduate Profile and CSMLS National Competencies.

6 APPENDICES

6.1 Project Report Sections Omitted

- The CSMLS Competencies Expected of Entry-Level Medical Technologists is not included in this report. The competencies can be found at:
http://www.csmls.org/english/pdf/student/general_medical_laboratory_technology_competency_profile_2010.pdf
 - Revised first-year (didactic) course outlines are not attached to this report. These outlines can be obtained from the Program Chair.
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6.2 Environmental Scan Analysis

6.2.1 Programs scanned:

- Red River College of Applied Arts Science and Technology (RRC)
- British Columbia Institute of Technology (BCIT)
- College of the North Atlantic
- Dawson College
- Northern Alberta Institute of Technology (NAIT)
- Michner Institute
- St. Clair College Windsor Campus
- St. Lawrence College Kingston Campus
- New Brunswick Community College Saint John Campus
- Saskatchewan Institute of Applied Science and Technology Kelsey Campus (SIASST)

6.2.2 Program name:

Six of the ten institutions scanned – including RRC -offer the program under the name *Medical Laboratory Science* or *Medical Laboratory Sciences*.

NAIT, St. Lawrence College, and SIASST offer the program under the name *Medical Laboratory Technology*.

Dawson College uses the name *Biomedical Laboratory Technology*.

6.2.3 Credential offered:

RRC, College of the North Atlantic, NAIT, NBCC, and SIASST offer a *Diploma* while BCIT offers a *Diploma of Technology*.

Michner Institute, St. Clair College, and St. Lawrence College offer an *Advanced Diploma*.

Dawson College offers a *Diploma of College Studies*.

6.2.4 Duration:

RRC, NAIT, and SIASST have programs of 2 years duration.

BCIT, Michner Institute, and NBCC have programs of 2.5 years duration.

College of the North Atlantic, Dawson College, St. Clair College, and St. Lawrence College have programs of 3 years duration.

6.2.5 Start dates:

All institutions scanned have only one intake of students per year.

RRC, Dawson College, NAIT, and SIASST have start dates at the end of August.

College of the North Atlantic, Michner Institute, St. Clair College, St. Lawrence College, and NBCC have September start dates.

The BCIT program has a January start date.

6.2.6 Fees:

RRC	Year 2 - \$3,306 Year 2 - \$3,331 Books & Supplies: Year 1 - \$1,000, Year 2 - \$1,000
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BCIT	\$2,776.61 per term (5 terms in total) Books & supplies: Level 1 - \$1,550; Level 2: - \$380; Level 3: - \$570, Level 4: - \$100; Level 5: - \$100
College of the North Atlantic	\$726.00 per semester (5 semesters) Work term fee: \$363.00 per semester (1 semester) Equipment & materials fee: \$110 per semester (5 semesters)
Dawson College	Free for Quebec residence and landed immigrants with permanent residence in Quebec Application and student fees: \$230.00 Books and supplies: \$400 - \$800 per year (3 years)
NAIT	\$6618.40 Books & program fees: \$4736.00 Other fees (health, dental, SA, Technology): \$1,034.00
Michner Institute	\$4,500.00 per year (2.5 years)
St. Clair College	First year: \$1,920.00, second & third year: \$1,892.80 Other fees: \$442.89 Books and supplies: \$1,000.00 per year (3 years)
St. Lawrence College	Tuition: \$2,713.00 per year (3 years)
NBCC	Tuition: \$2,600.00 per year (2.5 years)
SIAST	Year 1:-\$3,880.00, Year 2:-\$4,462.00 Books & supplies: Year 1 - \$2,180.00, Year 2 - \$270.00

6.2.7 Accreditation:

All scanned programs are accredited by the Conjoint Committee on Accreditation, Canadian Medical Association.

6.2.8 Licensing of graduates:

Graduates of all scanned programs are licensed by successfully completing the national examination set by the Canadian Society of Medical Laboratory Sciences.

6.2.9 Partners:

Please refer to the *Environmental Scan Summary Matrix*.

6.2.10 Entrance requirements:

For a complete description of entry requirements of all scanned programs refer to the *Environmental Scan in Appendix 4.2*.

6.2.10.1 Academic pre-requisites

BCIT, Dawson College, NAIT, Michner Institute, St. Clair College, St. Lawrence College, NBCC, and SIAST accept High School graduates with some restrictions as to course credits and grades achieved.

RRC and College of the North Atlantic require entrants to have achieved some prior post-secondary credit or credentials.

6.2.10.2 Selection criteria

BCIT, College of the North Atlantic, NAIT, Michner Institute, St. Clair College and SIAST use competitive selection criteria that favour applicants who exceed stated minimum requirements for entry.

Dawson College uses a screening interview to select applicants.

RRC, NBCC, and St. Lawrence College admit applicants who meet stated entry requirements on a first-come, first-serve basis.

Admissions

6.2.11 Admissions Policy:

Please refer to the Environmental Scan in *Appendix 4.2* for detailed descriptions of admissions policies at the institutions that were scanned.

It is important to note that the degree to which the programs scanned are able to employ various selection criteria are either enabled or prohibited by these institutional admissions policies.

6.2.12 Program renewal policy:

Please refer to the Environmental Scan in *Appendix 4.2*.

NAIT and NBCC did not provide information on their respective program renewal policies.

6.2.13 Curriculum model:

Eight of the ten scanned programs employ a curriculum model that is instructor lead with laboratory and clinical components.

The BCIT program is the only one scanned that uses a competency-based curriculum model.

Michner Institute uses a unique model with three focused components.

1. Inter-professional education that is intended to foster collaboration among health care providers.
2. Simulation education which is seen as a complement to clinical education and is intended to mirror clinical practice, but in a safe and controlled environment.
3. Health care competency assessment which is focused on “discipline specific and inter-professional skills, as well as the attitudes and behaviors required of a health care professional prior to entering the clinical environment.”

6.2.14 Courses:

Please refer to the Environmental Scan in *Appendix 4.2*.

6.2.15 Current challenges:

None of the programs, except for RRC, shared any of the program challenges they face.

The RRC program challengers are:

- Curriculum renewal to incorporate new competencies identified by the Canadian Society for Medical Laboratory Science by 2010.
 - Low success rates on national licensing exams.
 - Building positive relations with clinical partners.
 - Student retention.
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6.3 Environmental Scan

6.3.1 Red River College – Medical Laboratory Sciences

College	Red River College of Applied Arts Science and Technology 2055 Notre Dame Ave., Winnipeg, MB R3H 0J9 http://www.rrc.mb.ca/
Program Name	Medical Laboratory Science
Credential	Diploma
Duration	2 years. The program runs 22 months consecutively, with predetermined breaks and a completion date in June.
Start	August
Fees	Tuition and Student Fees: \$3,306 – Year 1, \$3,331 – Year 2 Books & Supplies: \$1,000 – Year 1, \$1,000 – Year 2
Accreditation	Conjoint Committee on Accreditation, Canadian Medical Association
Licensing of Graduates	National examination set by the Canadian Society of Medical Laboratory Sciences
Partners	<ul style="list-style-type: none"> • Diagnostic Services Manitoba • Winnipeg Regional Health Authority • Hospital laboratories in Winnipeg, Brandon, and rural municipalities.
Entrance Requirements	<ol style="list-style-type: none"> 1. 24 credits of post secondary education from a recognized college or university including General Chemistry (3 credits), Intro to Physical Chemistry (3 credits) or Intro to Organic Chemistry (3 credits), Anatomy & Physiology (6 credits), Biology (6 credits), Basic Statistical Analysis (3 credits), and Communications (3 credits). and 2. Completion of one day of occupational familiarization (an observation experience) to the Medical Laboratory Science profession at a hospital or medical laboratory clinic (to be arranged by RRC). and 3. Submission of up-to-date immunization records <p>After notice of acceptance, evidence of current certification in Standard First Aid and Basic Rescuer level of CPR is required.</p>
Admissions Policy	<p>Board Policy #2.7: Admission Requirements (2006) <i>The President will not allow RRC's admission requirements for programs and services to differ from a first qualified/first served basis for applicants that have met the entrance requirements unless covered by a formal agreement.</i></p> <p>Board Policy #2.8: Admission Preference (2006) <i>The President will ensure that the College's admission preference for funded programs be given to applicants in the following order unless covered by a formal agreement: 1) Manitoba residents who are Canadian Citizens or Landed Immigrants; 2) All others.</i></p> <p>Policy C5 – Student Evaluation and Progression (1996) – covers 9 topics:</p> <ol style="list-style-type: none"> 1. Evaluation of students in programs delivered in traditional mode. 2. Evaluation of students in competency-based learning programs. 3. Evaluation in cooperative education/work experience. 4. Academic probation. 5. Grading system including credit hours, grade point average, and cumulative grade point average. 6. Student transcripts. 7. Final examinations.

	<p>8. Supplemental examinations. 9. Retention and review of examination or major term test papers.</p> <p>Policy C5 does not stipulate a minimum pass mark. Instead, satisfactory academic standing is determined by individual departments and is to be communicated to students at the beginning of the program. There is no exception set for high demand programs related to the admission process. Note: RRC does not have a policy dealing specifically with admissions.</p>
<p>Program Renewal Policy</p>	<p>Board Policy #2.3 (2006) – <i>The President will not allow academic and training programs at RRC to be managed without systems for ongoing assurance of quality, effectiveness and responsiveness to the needs of the employment sector and community.</i></p> <p>Policy B3 – New Academic Program Approval (1994): This policy covers the process for new program approval, but does not stipulate entrance requirements as part of the proposal. The items to be considered for preliminary approval are: <i>name of program; department; length of program; proposed credential awarded; proposed program start date; proposed program objectives; general program content; employment market; resource implications; availability of similar programs/impact on existing programs; resources required for feasibility study; and statement of consistency with the institution’s mandate.</i> Entrance requirements do not form part of the next phase of the approval process either.</p> <p>Policy B6 – Program Review (1995) – Specifies a 5 year curriculum review cycle for all programs, including those externally accredited. This policy does not outline any processes other than those for program review. Note: RRC does not have a policy dealing specifically with programming.</p>
<p>Curriculum Model</p>	<p>Instructor lead, laboratory, and clinical experience. Three (3) weeks of Phlebotomy clinical experience takes place during week 11 Clinical Chemistry rotation and 44 weeks of clinical placement takes place in Year 2.</p>

Courses	YEAR 1		
	TERM 1	COURSE NAME	CREDIT HOURS
	MLSC100	Clinical Microbiology 1	3
	MLSC102	Laboratory Safety and Risk Management	3
	MLSC103	Biochemistry 1	3
	MLSC105	Phlebotomy, Pre/Post Analytical Processing	3
	MLSC106	Analytical Techniques	3
	MLSC107	Biochemistry 2	3
	MLSC110	General Laboratory Practices	0
	MLSC205	Microanatomy	3
	TERM 2	COURSE NAME	CREDIT HOURS
	MLSC109	Immunology	3
	MLSC204	Clinical Microbiology 2	3
	MLSC305	Clinical Chemistry	3
	MLSC306	Haematology 1	3
	MLSC308	Histotechnology	3
	TERM 3	COURSE NAME	CREDIT HOURS
	MLSC101	Human Workplace Relations	3
	MLSC301	Clinical Chemistry 2	3
	MLSC304	Clinical Microbiology 3	3
	MLSC307	Transfusion Science	3
	MLSC403	Haematology 2	3
	YEAR 2		
	TERM 4	COURSE NAME	CREDIT HOURS
	MLSC402	Quality Management	3
	MLSC404	Clinical Education in Hematology	6
	MLSC405	Clinical Education in Microbiology	6
	MLSC406	Clinical Education in Histology	3
	MLSC407	Clinical Education in Transfusion Science	3
	MLSC408	Clinical Education in Chemistry	6
Course Descriptions	MLSC100 Clinical Microbiology 1		
	Explore the human microcosm through the eyes of the microscope. Participants will be introduced to the basic skills necessary to recognize and identify clinically significant microorganisms. They will describe relevant characteristics, perform exacting microbiological techniques, and apply identification principles and procedures to be able to successfully name pathogens from 'unknown' challenges in accordance with Canadian Society of Medical Laboratory Science (CSMLS) competencies. Safety, quality assurance, and employability skills will be emphasized.		
	MLSC103 Biochemistry 1		
	This course introduces students to the fundamental concepts and compounds of biochemistry. Students examine both the structure and role of fatty acids, lipids, amino acids, and proteins as well as bioenergetics and metabolism.		
	MLSC106 Analytical Techniques		
	This course is an introduction to common laboratory techniques of chemical analysis including spectrophotometric, fluorometric, osmometry, electrochemical, electrophoresis, immunochemical, chromatographic and other		

	selected instrumental methods.
	MLSC205 Microanatomy
	This course will provide an introduction to the functional classification of cells and tissue arrangements, followed by the microanatomical structures of the major organs of the body.
	MLSC102 Laboratory Safety and Risk Management
	This course is designed to provide students with the skills and knowledge of work safety in a laboratory situation. An emphasis is placed on the prevention and control of biological, chemical and physical hazards in the laboratory. Topics include regulatory compliance, WHMIS, universal precautions and emergency procedures.
	MLSC105 Phlebotomy, Pre/Post Analytical Processing
	Theoretical and applied knowledge of the techniques, skills and equipment to provide a safe effective blood collection service and prepare a variety of biological samples for diagnostic and therapeutic laboratory testing. Verify appropriate information on requisitions and samples and enter results into laboratory information systems.
	MLSC107 Biochemistry 2
	This course takes the basic fundamentals and principles learned in Biochemistry I and applies them at the molecular level. The course examines biochemical information systems at the molecular level, looking at the structure and chemistry of nucleic acids and their role in cellular function.
	MLSC110 General Laboratory Practices
	This course is designed to introduce students to the laboratory. Topics will include standard laboratory equipment, microscopy and solution preparation.
	MLSC305 Clinical Chemistry
	This course will provide the student with basic clinical, physiological and biochemical principles involved in the various organ systems. The student will gain an understanding of the biochemical tests required to diagnose and assess disease states.
	MLSC306 Haematology 1
	A theoretical course of normal and pathological haematologic states, as well as current investigative procedures and instrumentation will be covered.
	MLSC308 Histotechnology
	This course will provide an introduction to the principles and practices of preparing clinical specimens for histological examination including fixation, decalcification processing, embedding and microtomy. This will be followed by an overview of the techniques used to demonstrate cellular and non-cellular components for microscopic examination.
	MLSC109 Immunology
	This course is an introduction to the principles of immunology. Focus on the theory and applications of non-self recognition systems. The course covers the broad areas of defence mechanisms, the nature of the mammalian immune system, the immune response and discusses immunological disease states of auto-immunity, tumor immunology, transplant immunology and immunodeficiency.
	MLSC204 Clinical Microbiology 2
	This course is a continuation of the Clinical Microbiology 1 to include micro-organisms found in the genital tract, cardiovascular and central nervous systems, eye/ear specimens, superficial wound specimens and deep wound specimens.
	MLSC301 Clinical Chemistry 2
	MLSC304 Clinical Microbiology 3
	This course is a continuation of MLSC100 Clinical Microbiology 1

	and MLSC204 Clinical Microbiology 2. This course will identify clinically significant organisms in special hosts, uncommon clinically significant organisms, aerobic actinomycetes, fungi and parasites.
	MLSC307 Transfusion Science
	This is a theoretical course on the principles of blood grouping, characteristics of blood antigen systems, red cell antibody identification techniques, adverse transfusion reactions, blood group-related disorders, compatibility testing, testing methodologies, and the requirements for blood component production, handling, use and storage.
	MLSC101 Human Workplace Relations
	This course is designed to develop the student's understanding of health care delivery systems, communication in the health care setting, death and dying, teamwork, conflict resolution, critical thinking, unions, professional associations and legal and ethical aspects of health care.
	MLSC403 Haematology 2
	This course is a continuation of MLSC306 Haematology 1 which includes theoretical aspects of coagulation and fibrinolysis, chronic and acute malignant blood disorders and the validation of laboratory results.
	MLSC404 Clinical Education in Hematology
	This course is designed to prepare student technologists, through hands-on experience in a clinical laboratory, to be competent in the technical aspects of clinical hematology.
	MLSC405 Clinical Education in Microbiology
	This course is designed to prepare students, through hands-on practical experience in a clinical laboratory, to become competent in the technical aspects of clinical microbiology.
	MLSC406 Clinical Education in Histology
	This course is designed to prepare students, through hands-on practical experience in a clinical laboratory, to become competent in the technical aspects of histology.
	MLSC407 Clinical Education in Transfusion Science
	This course is designed to prepare students, through hands-on practical experience in a clinical laboratory, to become competent in the technical aspects of Transfusion Science.
	MLSC408 Clinical Education in Chemistry
	This course is designed to prepare students, through hands-on practical experience in the clinical chemistry laboratory, to become competent in the technical aspects of clinical chemistry.
	MLSC402 Quality Management
	This course provides learners with a brief overview of some of the general principles for ensuring quality patient care as it relates to proficiency of laboratory specimen processing. This includes the discussion of quality management and quality assurance concerns of pre-analytical, analytical, and post-analytical variables of internal laboratory activities and external programs used to assess results of those internal activities.
Contact	Gillian Rimmer, Program Coordinator Tel:204-632-2009, E-mail: grimmer@rrc.mb.ca
Current Challenges	<ul style="list-style-type: none"> • Curriculum renewal to incorporate new competencies identified by the Canadian Society for Medical Laboratory Science by 2010. • Low success rates on national licensing exams.

	<ul style="list-style-type: none">• Building positive relations with clinical partners.• Student retention.

6.3.2 British Columbia Institute of Technology – Medical Laboratory Science

College	British Columbia Institute of Technology 3700 Willingdon Avenue, Burnaby, British Columbia, Canada, V5G 3H2, 604-434-5734 www.bcit.ca
Program Name	Medical Laboratory Science
Credential	Diploma of Technology
Duration	2.5 years. This program spans two-and-one-half years, full-time, beginning in January each year. This includes a three-month break (June-August) after the first level, and a one-month break (June) the following summer after level 3. Students will complete level 5 of the program the following May, and will write CSMLS national certification examinations in early June after completing Level 5.
Start	January
Fees	Tuition: Per term - \$2,776.61(includes tuition@ \$2213, SA fees@ \$59.11, health plan@ \$80, other@ \$72.50). Books and Supplies - Supplies, in addition to regular school supplies, include appropriate footwear, uniforms, trainee membership fees (\$80) and certification examination fees (\$300). Breakdown by level: Level 1: \$1,550; Level 2: \$380; Level 3: \$570, Level 4: \$100; Level 5: \$100
Accreditation	Conjoint Committee on Accreditation, Canadian Medical Association
Licensing of Graduates	National examination set by the Canadian Society of Medical Laboratory Sciences
Partners	Health Regions and Clinical Laboratories: <ul style="list-style-type: none"> • B.C. Biomedical Laboratories • Fraser Health Authority • Interior Health Authority • MDS-Metro Clinical Laboratories • Northern Health Authority • Provincial Health Services Authority • Vancouver Coastal Health Authority • Vancouver Island Health Authority
Entrance Requirements	Academic Requirements - High school graduation with the following courses: <ul style="list-style-type: none"> • English 12 (B) or English-language proficiency. All ESL applicants must undergo a verbal assessment (TSE 50+ or equivalent) in addition to other testing in reading, writing, and grammar • Biology 12 (C+) • Chemistry 12 (C+) • Principles of Math 12 (C+) or Applications of Math 12 (B+)

- Physics 11 (C+)

These courses need to have been completed in the past five years. If longer than five years has elapsed, individual assessment may be required.

Note: The above academic requirements are the minimum requirements for entrance. Because admission to this program is very competitive, most applicants who are accepted will have completed at least one year of post-secondary education.

2. Additional Requirements:

- Resume - For applicants with previous employment, not necessarily within the health care field, evidence of this employment and a satisfactory letter of reference. For applicants without work experience, we accept volunteer experience, preferably in a health care setting. The volunteer experience must include a minimum of 30 hours work with a satisfactory reference.
- A letter of intent (approximately 500 words) detailing the applicant's career goals, knowledge of the profession, related experience and reasons for seeking admission to the Medical Laboratory Science program.
- All applicants must sign a Program Requirements Form (PDF,526KB) acknowledging the nature of this training, and the physically demanding nature of this work.

In addition to the above requirements, the following attributes are recommended to ensure the best possible chance of success in this program:

- Competence in written and oral English.
- A caring and professional attitude, meticulous work habits, fine motor skills, good manual dexterity.
- The ability to work quickly and accurately under pressure and to make decisions which directly affect the diagnosis and treatment of disease.
- Strong problem-solving skills, good interpersonal skills and the ability to function as part of a team.
- Physical stamina: Applicants should be aware that medical laboratory work is physically demanding and requires standing for long periods of time.
- The ability to clearly differentiate colours.
- The ability to use word-processing, spreadsheet and communication software. Several course assignments must be word processed, and medical laboratory technologists work with laboratory and hospital information systems.
- Basic First Aid certificate, which includes CPR level C is highly recommended.

Based on the above academic and non-academic requirements, a short-list of the top applicants will be created:

- Short-listed applicants will be required to attend a laboratory tour which will

	<p>be arranged by BCIT. The purpose of the tour is to introduce applicants to the environment of the clinical laboratory and enable them to see the daily operation of this diagnostic services department. At the end of the tour, each applicant will be asked to complete a <u>questionnaire</u> related to the tour. This questionnaire will be returned to BCIT and will be scored by the Admissions committee.</p> <ul style="list-style-type: none"> Applicants may be required to attend an <u>interview</u>; BCIT will contact the applicant accordingly. <p>Note: BCIT chooses those applicants considered to have the best chance for success in the program based on the above requirements.</p>																																				
Admissions Policy	<p>The BCIT Admissions Policy (5003) has 4 guiding principles: 1) priority for BC residents; 2) entrance requirements should ensure that students accepted into a program are afforded every chance of academic success; 3) equality of access; 4) recognizes and provides for advanced placement. All BCIT applicants must possess an acceptable level of English language skills. Selection of Candidates: <i>BCIT reserves the right to accept only those applicants who, having met the minimum program entrance requirements, are best suited for success in the program.</i> Program Entrance Requirements: <i>These may include academic and non-academic criteria, such as: a) designated courses with specific achievement levels; b) essays, references, interviews, resumes; c) medical certificates; d) testing; e) assessment of prior learning; f) approved upgrading courses and assessment testing.</i></p>																																				
Program Renewal Policy	<p>BCIT Programming Policy (5004) is comprehensive, covering all aspects of program development, change, and renewal. The Dean of each school is responsible for establishing and chairing a Program Review Panel. Reports are submitted by the Dean to the Vice-President, Education and then to the Board of Governors. All programs undergo a Phase I review annually. The focus of a Phase I review is accountability. It involves numerical consolidation of annual program metrics compared to criteria established in each programs education and operating plans. Programs also undergo a Phase II review on a 5 year cycle. The focus of the Phase II review is sustainability and a number of topics impacting program sustainability, such as technology, knowledge, and market demand, are examined.</p>																																				
Curriculum Model	<p>The Medical Laboratory program is a competency-based program. It is designed and based on competencies established by the national certifying body, the Canadian Society of Medical Laboratory Sciences (CSMLS), and by the BCIT Medical Laboratory industry-based design process.</p> <p>The program provides theoretical, practical and clinical learning experiences. BCIT arranges clinical training for the student.</p>																																				
Courses	<table border="1"> <thead> <tr> <th colspan="3">Level 1</th> <th>Credits</th> </tr> </thead> <tbody> <tr> <td>BHSC 1115</td> <td>Anatomy and Physiology for Medical Laboratory Science 1</td> <td></td> <td>3.5</td> </tr> <tr> <td>BHSC 1148</td> <td>Self and Others</td> <td></td> <td>1.5</td> </tr> <tr> <td>COMM 1170</td> <td>Communications for Medical Laboratory Science 1</td> <td></td> <td>2.5</td> </tr> <tr> <td>MLSC 1100</td> <td>Safe Practices and Professional Responsibilities 1</td> <td></td> <td>1.5</td> </tr> <tr> <td>MLSC 1104</td> <td>Specimen Procurement</td> <td></td> <td>2.5</td> </tr> <tr> <td>MLSC 1105</td> <td>Microanatomy</td> <td></td> <td>3.5</td> </tr> <tr> <td>MLSC 1108</td> <td>Clinical Microbiology 1</td> <td></td> <td>3.0</td> </tr> <tr> <td>MLSC 1117</td> <td>Instrumental and Biochemical Analysis</td> <td></td> <td>5.0</td> </tr> </tbody> </table>	Level 1			Credits	BHSC 1115	Anatomy and Physiology for Medical Laboratory Science 1		3.5	BHSC 1148	Self and Others		1.5	COMM 1170	Communications for Medical Laboratory Science 1		2.5	MLSC 1100	Safe Practices and Professional Responsibilities 1		1.5	MLSC 1104	Specimen Procurement		2.5	MLSC 1105	Microanatomy		3.5	MLSC 1108	Clinical Microbiology 1		3.0	MLSC 1117	Instrumental and Biochemical Analysis		5.0
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	<p>and other immunogens. The respective roles of the innate and acquired immune systems are discussed as are the cooperative roles of the associate immune cells and non-cellular soluble components; namely, antibodies, cytokines, complement and mediators of inflammation. Immunological concepts covers in this course include hypersensitivity, autoimmune and transplant/transfusion immunology, bacterial, viral, and parasitic immunity, and basic serology" relevance of these concepts to selective disease states is discussed. To prepare the student for more in-depth discussion of immunobased techniques in the discipline specific program courses, the chemistry and reaction conditions underlying antigen-antibody interaction in vitro is detailed as is the relevance of immunological-based techniques to the measurement of analytes in the medical laboratory.</p> <p>Prerequisite: All Level 1 MLSC Courses</p> <p>BHSC 1148 - Self and Others: Discusses the importance of communication within the healthcare team. Uses an experiential and self- reflective approach to develop self- awareness, an increased understanding of self, and how one's own interpersonal style affects others. Provides critical elements for healthcare professionals including concepts such as communication skills, establishing and maintaining a relationship with clients and others, caring, empathy and courtesy. Emphasizes respecting and responding sensitively to individuals with cultural diversity. Includes other skills for success such as conflict resolution and stress management.</p> <p>BHSC 2215 - Anatomy and Physiology for Medical Laboratory Science 2: Continues the study of human anatomy and physiology as it relates to medical laboratory science. Includes discussion of the respiratory, digestive, endocrine, and urinary systems.</p> <p>Communication</p> <p>COMM 1170 - Communications for Medical Laboratory Science 1: Introduces students to the communication needs of the health profession. Students will learn how to communicate well with patients, other health professionals, their peers, and their instructors. The course will cover planning, organizing and presenting information orally and in writing. Specific assignments include action memos, procedures, explanations, informative presentations, and a clinical experience report.</p> <p>COMM 2270 - Communications for Medical Laboratory Science 2: This course builds on the communication skills of Level 1. Students will learn how to present themselves confidently and persuasively over the phone, in presentations, in meetings, and in a professional job search. Specific assignments include telephone techniques, persuasive presentations, problem solving and conflict resolution in meetings, and a job package, including a resume, cover letter, and interview techniques. Prerequisites: COMM 1170</p> <p>Medical Laboratory Science</p> <p>MLSC 1100 - Safe Practices and Professional Responsibilities 1: Explores the concepts of safe and professional practice for the Medical Laboratory Technologist. Examines concepts such as the importance of minimizing risk, the legal aspect of safety, and responding to emergencies as they arise. Discusses professionalism, confidentiality, client-centred services, professional standards, and other issues impacting the practice of all healthcare professionals.</p> <p>MLSC 1103 - Clinical Practicum 1: This two-week block spent in a clinical laboratory develops skills in phlebotomy and accessioning of laboratory specimens. Also provides opportunity to demonstrate the concepts of safety, legal</p>
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	<p>requirements, patient empathy, professionalism, and communication. Prerequisites: COMM 1170 and BHSC 1115 and BHSC 1148 and 60% in MLSC 1100 and 60% in MLSC 1104 and 60% in MLSC 1105 and 60% in MLSC 1106 and 60% in MLSC 1107 and 60% in MLSC 1108</p> <p>MLSC 1104 - Specimen Procurement: Focuses on the collection, receiving and pre-analytical processing of clinical laboratory specimens. The major activity is blood collection by venipuncture and capillary puncture. Reinforces behaviour that ensures safety and professionalism and demonstrates empathy and respect for the patient.</p> <p>MLSC 1105 - Microanatomy: Introduces human microanatomical structure, function, and histochemistry. Describes and discusses all of the basic tissue types and organ systems in relation to laboratory analysis of patient specimens. Includes microscopic evaluation of prepared tissue sections.</p> <p>MLSC 1108 - Clinical Microbiology 1: Introduces clinical microbiology concepts and theory, and studies bacterial cell structure, physiology, metabolism and genetics. Discusses methods of action of antimicrobial agents and the development of resistance by bacteria to many of these agents. Introduces the concepts of disease and pathogenicity. Through laboratory sessions, teaches the basic skills to isolate bacteria, stain smears, record colonial morphology and perform preliminary identification techniques. Emphasizes safe handling techniques, and uses cooperative learning to facilitate the development of interpersonal skills and enhance student learning as team members teach and support each other.</p> <p>MLSC 1111 - Hematology 1: Introduces the study of peripheral cells, their development, identification and functions. The major activity is microscopic examination of blood films. Includes basic non-automated tests used to assess blood cells.</p> <p>MLSC 1115 - Histology 1: This laboratory based course consists of processing surgical and autopsy specimens through to stained slide preparations. Includes activities such as tissue fixation, paraffin processing, embedding, sectioning, and staining. Also includes biological staining procedures such as methods for routine morphological assessment, connective tissues, carbohydrates, microbiological specimens, pigments, leukocyte enzymes, silver impregnation, and immunohistochemical markers. Prerequisites: 60% in MLSC 1105</p> <p>MLSC 1117 - Instrumental and Biochemical Analysis: This seminar and laboratory-based course introduces safe, competent laboratory practice and analysis. Reviews basic, organic and bio-chemical fundamentals in the context of analytical principles and clinical analyte measurement. Addresses quality laboratory practice and introduces statistical analysis of data. The laboratory sessions include proper reagent preparation, and the correct use and maintenance of microscopes, balances, pH meters, spectrophotometers, and electrophoresis apparatus.</p> <p>MLSC 1213 - Transfusion Science 1: Introduces the basic concepts of transfusion science, including the application of genetics and immunology to transfusion practice. Utilizes terminology needed to understand and communicate about transfusion practice. Presents an understanding of major blood group systems, and component therapy and explains the significance these have in transfusion science. Illustrates and provides opportunity to practice the basic techniques and more complex forms of testing used in transfusion service. Provides practice in pretransfusion testing, including ABO typing, Rh typing and</p>
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	<p>antibody screening. Covers the identification of irregular antibodies, complex patient presentations, hemolytic disease of the newborn and adverse reactions to transfusion. Describes blood products (components and fractions) and considers donor issues and special treatment of blood products. Introduces special transfusion situations, based on case study presentation.</p> <p>MLSC 1214 - Molecular Diagnostic Techniques - Theory: This is an introductory course in molecular diagnostic techniques. There are brief reviews of DNA structure and chemistry; gene structure, transcription, and translocation; autosomal recessive inheritance; DNA polymorphisms and mutations. The theoretical and practical principles underlying basic molecular techniques are discussed as they apply to DNA diagnostics in the clinical laboratory.</p> <p>MLSC 2108 - Clinical Microbiology 2: Continues to build knowledge and competence in the area of clinical microbiology. Covers clinically relevant bacteria, emphasizing the ability to isolate and identify common pathogens from clinical specimens. Also emphasizes performance and assessment of quality control procedures. Provides self-directed and cooperative learning to develop a full understanding of learning goals.</p> <p>MLSC 2111 - Hematology 2: Introduces the study of peripheral blood and bone marrow abnormalities relating to malignancies such as leukemia, lymphoma, and myeloma. Devotes laboratory sessions to microscopic examination of appropriate blood and bone marrow slides. Seminar sessions discuss the role of the laboratory in diagnosis, classification, assessing treatment outcomes, and identifying prognostic indicators. The study of hemostasis is evaluating the process of how blood coagulates. Discusses laboratory investigation of activation, clot formation and lysis. Includes performing common laboratory tests using both automated and manual methods.</p> <p>MLSC 2112 - Medical Laboratory Arts and Science 1: This distance education course enhances the learning that has taken place during the semester and applies that learning to the clinical laboratory setting.</p> <p>MLSC 2117 - Clinical Chemistry 1: Delivers chemistry of glucose, electrolytes and water balance, pH, liver function, liver enzymes, cardiac markers, renal functions, lipids, endocrinology, serum proteins, calcium, magnesium, phosphate, and urinalysis. Enables use of automated and manual techniques to perform testing on serum and urine samples for these analytes. Instructs how to use laboratory techniques, equipment and instrumentation to produce accurate, precise test results within the established quality control parameters set. Performs macro, micro and biochemical urinalysis techniques. This course also explores concepts such as the Quality Systems approach to the provision of laboratory services, legal standards of practice, issues relevant to healthcare, and the utilization of laboratory information systems. Prerequisite: All Level One Courses.</p> <p>MLSC 2213 - Clinical Practicum 2: This practicum block is spent in a clinical laboratory to develop skills in clinical chemistry, clinical microbiology, hematology, histology, and transfusion science. It provides opportunities to demonstrate and build on safe practice professionalism, patient relationships, and communication. Prerequisite: All MLSC Level 3 courses.</p> <p>MLSC 2214 - Molecular Diagnostic Techniques - Laboratory: An introductory laboratory course in molecular diagnostic techniques. Emphasizes in laboratory sessions the need to pay strict attention to detail and further develop acute observational skills. Teaches how to interpret the results of a variety of molecular techniques and develop basic problem solving skills as they apply to the molecular</p>
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	<p>laboratory. Prerequisite: All MLSC Level 3 courses.</p> <p>MLSC 3110 - Safe Practices and Professional Responsibilities 3: This course builds on professionalism concepts introduced in levels 1 and 2. Students will have an opportunity to explore professional responsibilities of medical laboratory technologists, including issues of accountability, ethics, life long learning, developing and implementing quality management processes, and impacts of healthcare policy. Within this framework, students will review the CSMLS competencies expected of entry level technologists and assess their own competency level using evidence collected, and set out individual learning plans to facilitate success at the national certification examination. Students will incorporate these themes in a major project, the development of a personal portfolio.</p> <p>MLSC 3117 - Clinical Chemistry 2: Students will enhance their knowledge about Clinical Chemistry in the diagnosis of pathological conditions encountered in the clinical laboratory and their significance to patient outcomes. Topics include: Stat testing and handling of critical values, acid/base balance, blood gases, disorders of lipid metabolism, serum electrophoresis, immunoassay, endocrinology, biochemical tests related to heme synthesis, therapeutic drug monitoring, toxicology, chromatography, atomic absorption, tumor markers, body fluid analysis and Point of Care testing. Method evaluation, statistics, laboratory math, and urinalysis are reviewed.</p> <p>MLSC 3118 - Clinical Microbiology 3: This course builds on previous knowledge and competence in the area of Clinical Microbiology. Clinically relevant bacteria, pathogenesis, and manifestations of disease within the urinary, genital, gastrointestinal and respiratory tracts, blood stream, central nervous system, joints, soft tissues will be covered. Antibiotic susceptibility testing and mechanisms of resistance will be included. The role of the laboratory in infection control will be introduced. Cooperative learning will be used to provide opportunity to develop a full understanding of the learning goals</p> <p>MLSC 3213 - Clinical Practicum 3: This practicum block is spent in a clinical laboratory to develop skills in clinical chemistry, clinical microbiology, hematology, histology, and transfusion science. It provides opportunities to demonstrate and build safe practice professionalism, patient relationships, and communication. Prerequisite: All MLSC Level 4 courses.</p>
Contact	Colleen Gibson, Program Head Email: Colleen_Gibson@bcit.ca
Current Challenges	

6.3.3 College of the North Atlantic – Medical Laboratory Sciences

College	College of the North Atlantic Prince Philip Drive Campus P.O. Box 1693 1 Prince Philip Drive St. John's, NL A1C 5P7 Tel: (709) 758 7284 Fax: (709) 758 7304 www.cna.nl.ca
Program Name	Medical Laboratory Sciences
Credential	Diploma
Duration	3 years
Start	September
Fees	Tuition per semester - \$726 Equipment/Materials fee per semester - \$110 Work term fee per semester - \$363
Accreditation	Conjoint Committee on Accreditation, Canadian Medical Association
Licensing of Graduates	National examination set by the Canadian Society of Medical Laboratory Sciences
Partners	<ul style="list-style-type: none"> • Burin Peninsulas Health Care Centre, • Carbonear General Hospital, • Central Newfoundland Regional Health Centre, • Dr G B Cross Memorial Hospital, • Health Care Corporation of St. John's, • James Paton Memorial Hospital, and • Western Memorial Hospital.
Entrance Requirements	<p>Applicants wishing to pursue a career in Medical Laboratory Sciences must complete the Medical Sciences I (General) program of studies. Selection to Medical Laboratory Sciences is competitive and will occur at the end of the second semester.</p> <p>Selection:</p> <ol style="list-style-type: none"> 1. Students will compete for entry into the third semester. 2. Competition will be based on academic standing in semesters 1 and 2 of the Medical Sciences I (General) program. Students must pass all first and second semester (minimum 50%) courses and have a minimum G.P.A. of 2.00 to be considered for admission to the third semester. 3. The student's weighted average at the end of the second semester will be used to calculate academic standing for purposes of calculation. In the case of students who have been exempted from courses in the first and second semesters, the mark obtained in the course completed by the student at another post secondary institution, or other College program will be used in calculating the weighted average as if the course had been completed as part of the Medical Sciences I (General) program. <p>NOTE: To be employed in the Medical Laboratory Science field, one must have sufficiently strong eyesight to permit extended microscopic work, and <u>normal colour perception</u>.</p> <p>ENTRANCE REQUIREMENTS for Medical Sciences I (General): Comprehensive Arts and Science Certificate (College Transition program) with the following courses:</p>

	<ol style="list-style-type: none"> 1. Essential English I and II (minimum 60%) 2. Math Fundamentals I and II (minimum 60%) 3. Four Science courses chosen from 2 of the following 3 combinations: <ol style="list-style-type: none"> a. Introduction Biology I and II b. Introductory Chemistry I and II c. Introductory Physics I and II <p>Note: It is strongly recommended that all CAS students who intend to enroll in this program complete both of the Introductory Biology courses. In addition, it is recommended that students who intend to enroll in the Medical Laboratory Sciences program or the Respiratory Therapy program complete both of the Introductory Chemistry courses and that students who intend to enroll in the Medical Radiography program complete both of the Introductory Physics courses.</p> <p>OR</p> <p>High School Graduation Certificate with a 60% overall average in the following:</p> <ol style="list-style-type: none"> 1. Language (1 credit) (minimum 60%) chosen from 3101, 3102, 3103, 3112, 3172, 3192, 4121 <p style="text-align: center;">OR</p> <p>English (2 credits) (minimum 60%) chosen from 3201, 3211, 3202, 3212, 3231, 3232, 3281, 3282, 3291, 3292</p> <ol style="list-style-type: none"> 2. Mathematics (2 credits) chosen from: <p>Advanced: 3201, 3211, 3221, 3231, 3271, 3281, 3291, 4225 (50%) minimum</p> <p>Academic: 3203, 3200, 3210, 3230, 3270, 3280, 3290 (60%) minimum</p> <p style="text-align: center;">OR</p> <p>Mathematics (4 credits) chosen from:</p> <p>Advanced: 2205, 3205 (50% minimum in each course)</p> <p>Academic: 2204, 3204 (60% minimum in each course)</p> <ol style="list-style-type: none"> 3. Science (4 credits) chosen from two of: <p>Biology: 3201, 3211, 3231, 3271, 3281, 3291, 4221</p> <p>Physics: 3204, 3214, 3274, 3284, 3294, 4224</p> <p>Chemistry: 3202, 3212, 3230, 3272, 3282, 3292, 4222</p> <p>Geology: 3203, 3213, 3223, 3273, 3283, 3293</p> <p>Earth Systems: 3213, 3209</p> <p>OR</p> <p>An Adult Basic Education Graduation Certificate indicating completion of the academic stream with an overall 60% average including the following courses:</p> <p>Communication Skills from <u>one</u> of the following:</p> <ol style="list-style-type: none"> 1. Communications (minimum of 60%) IC3211 & IC3112 plus one of IC3116 or IC3215 or IC3321 or IC3222. 2. Mathematics (minimum of 60%) from <u>one</u> of the following sections: <ol style="list-style-type: none"> a. IM3212, IM3213 and IM3216 b. IM3219 3. Science - from two of the following sections: <ol style="list-style-type: none"> a. Biology IB3113, IB3214, IB3115, IB3316 b. Chemistry IH3215, IH3116, IH3117, IH3118 c. Physics IP3111, IP3112, IP3215, IP 3216 d. Earth Sciences IS3212, or IS3213 or IP3214
Admissions Policy	<p>Policy AC102: Admission - College of the North Atlantic has an open admission policy where applicants are accepted as they qualify. Qualifications are set by the program. No basic pass mark is mentioned in the policy. Presumably progression standards are set by the program as</p>

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Program Renewal Policy	Policy AC109: Program Review (1999) - Program review operates on a 5 year cycle for all programs. The review process examines: a) program history; b) student demand; c) attrition rates; d) graduate employment rates; e) labour market demand; f) Advisory Committee recommendations; g) direct link to regional economic development; h) external accreditation; i) student and graduate feedback; j) methodology of delivery; k) staff qualifications/skills; l) resources. A formal committee process exists for setting a schedule of program reviews.
Curriculum Model	<p>The curriculum for this program is designed to encompass three years of training. The first two years are spent at the College and the emphasis is placed on academic and theoretical training.</p> <p>During the sixth, seventh, eighth and ninth semesters emphasis is placed upon practical training with clinical experience being conducted in health care institutions and a simulated hospital laboratory environment.</p>
Courses and Course Descriptions	<p>Semester 1</p> <p><u>CM1400 Communications or CM1120 English</u> This course is designed to teach technology students the fundamentals of technical reporting in oral and written forms. Emphasis is on strategies of technical reporting, research techniques and organizational skills.</p> <p><u>MA1700 or MA1100 Mathematics</u> This is a course in pre-calculus mathematics designed to help alleviate specific weaknesses in student's mathematical skills and thereby increase their chances for success in other technical courses.</p> <p><u>PH1100 or PH1120 Physics</u> This is an introductory physics course designed to extend students knowledge and understanding of basic physics principles, concepts and applications relating to mechanics. This course also extends abilities in data handling, problem solving and experimentation.</p> <p><u>CH1200 or CH1130 Chemistry</u> This is an introductory course in chemistry dealing with the fundamental laws of chemistry, the nature of matter and structure of the atom, the periodic table, chemical bonding, stoichiometry, the physical states of matter and solutions. The quantitative aspects of chemistry are stressed.</p> <p><u>BL1500 or BL1170 Biology</u> This is an introductory biology course with emphasis placed on the following: a study of the cell, its structure and function; a comparison between animal and plant cells; a brief study of selected organisms of the Protista Kingdom and a comparison between eucaryotes and procaryotes; a study of DNA and RNA and protein synthesis; an introductory study of gene regulation in procaryotes and eucaryotes; the principles of hereditary; and introductory study of biotechnology; a study of tissues; an introduction to anatomical and medical terminology, and a study of the skeletal system.</p> <p>Semester 2</p> <p><u>CM1401 Communications or CM1145 English</u> This course is designed to help students formulate criteria for structuring informal and semi-formal reports. Various report formats will be examined with emphasis on statistical data analysis, documentation and illustration methods. Oral reporting techniques will be enhanced through problem-solving reports and the technical sales presentation. Prerequisite(s): CM1400</p>

	<p><u>MA1670 Statistics</u> This course is designed to introduce students to the basic principles of probability and statistics.</p> <p><u>PH1200 or PH1121 Physics</u> This is a second semester course designed to extend students knowledge and understanding of basic physics principles, concepts and applications relating to waves, sound, light, heat and electricity. Prerequisite(s): PH1100 or PH1120</p> <p><u>CH1201 or CH1131 Chemistry</u> This is a continuation of CH1200. Major topics include: the gas laws, oxidation-reduction, electrochemistry, chemical nomenclature, chemical kinetics, chemical equilibrium. The quantitative aspects of chemistry are stressed. Prerequisite(s): CH1200</p> <p><u>BL1501 Biology</u> This is a course in human anatomy and physiology with emphasis being placed on the following systems: cardiovascular, lymphatic, respiratory, endocrine, nervous and sensory organs, and related medical terminology. Prerequisite(s): BL1500</p> <p>Semester 3 (Intersession 1)</p> <p><u>BL2100 Biology</u> This is a continuation of the second semester anatomy and physiology course with emphasis on the following systems: digestive, urinary, and reproductive, and related medical terminology. Prerequisite(s): BL1501</p> <p><u>MC1150 Productivity Tools 1</u> This course is designed to give the student a working knowledge of a software suite. Particular emphasis is given to the word processing, spreadsheet, database or presentation components of the suite, e-mail and internet.</p> <p><u>PS1100 or PS1150 Psychology</u> This is an introductory psychology course. Current experimentation and the various methods of psychological research are emphasized throughout the course. The topics to be covered include: psychology as a science, learning, perception, sensation, personality and human development.</p> <p><u>CH2200 or CH1150 Chemistry</u> This is a continuation of the second semester course. Major topics include various types of chemical equilibria such as gaseous equilibria, solubility equilibria, and acid/base equilibria. The quantitative aspects are stressed. Prerequisite(s): CH1201</p> <p>Semester 4</p> <p><u>BL2400 Microbiology</u> This course consists of an introduction to the principles and methods of microbiology. Selected topics include the classification, structure, staining and cultivation of bacteria; bacterial physiology and genetics; control of micro organisms; host parasite relationships and diagnostic immunology. Prerequisite(s): Completion of semester 3.</p> <p><u>CH2320 Organic Chemistry/Biochemistry</u> This is an introductory course in organic chemistry and biochemistry for Medical Laboratory Sciences students. Major topics studied are the carbon atom, chemical nomenclature and structure of the alkane, alkenes, aldehydes, ketones, carboxylic acids, alcohols, ethers, aromatic hydrocarbons, amino acids, structure, properties and metabolism of carbohydrates, proteins and lipids, diabetes, non-protein nitrogenous</p>
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	<p>compounds, acid base balance, body water/electrolyte balance and enzymes. Prerequisite(s): Successful completion of semester 3.</p> <p><u>CH2520 Basic Laboratory Principles</u> This course will introduce laboratory safety, basic laboratory techniques and skills, laboratory instrumentation, and quality control procedures and interpretation. These principles will be reinforced in laboratory periods using discovery, demonstration and participation techniques. Prerequisite(s): Successful completion of semester 3.</p> <p><u>ML1200 Hematology</u> This course will provide students with a fundamental knowledge of the erythrocytes and leukocytes, including: origin, characteristics, functions, routine laboratory procedures, normal and abnormal morphology, and abnormal conditions with emphasis on the anemias. Prerequisite(s): Successful completion of all third semester courses.</p> <p><u>ML1300 Introduction to Histological Technique</u> This course will introduce the student to the theoretical and practical aspects of histology as follows: methods of collection, fixation, processing and blocking of tissues; decalcification of bone; use and care of microtomes and section cutting. Prerequisite(s): Successful completion of all third semester courses.</p> <p><u>ML2400 Introduction to Blood Group Systems</u> The course of study will provide students with a fundamental knowledge of both the theoretical and technological aspects of the human blood group systems. Prerequisite(s): Successful completion of all semester 3 courses</p> <p>Semester 5</p> <p><u>BL2401 Clinical Microbiology</u> This course consists of a systematic study of the pathogenicity, epidemiology, morphology, and laboratory identification of the various microbes associated with infectious disease. Major emphasis will be on the bacteria with a brief study of clinically important yeast-like fungi. Prerequisite(s): BL2400</p> <p><u>CH2511 Clinical Chemistry</u> This course consists of a study of the theoretical and practical aspects of the analysis of body fluids. Major topics studied include: carbohydrates, proteins, lipids, acid/base balance, enzymology, nonprotein nitrogenous substances, electrolytes, liver function, kidney function, toxicology, and thyroid function testing. Prerequisite(s): CH2520, CH2320</p> <p><u>ML1211 Hematology</u> This course is a continuation of the study of leukocytes with emphasis on leukemias, myeloproliferative disorders and lymphomas. It also introduces the student to the theory of blood coagulation. Including the functions of platelets, blood vessels and plasma factors and the laboratory investigation of abnormal bleeding and thrombosis. Prerequisite(s): ML1200</p> <p><u>ML1310 Introduction to Biological Staining</u> This course is provided to instruct the student in the theoretical and practical aspects of histology as follows: principles of microscopy, principles of staining, uses of various staining techniques and the identification of pigments and artifacts, and the microscopic identification of tissue sections. Prerequisite(s): ML1300</p> <p><u>ML1500 Introduction to Transfusion Science</u> This course will provide the student with a fundamental knowledge of both the theoretical and technological aspects of blood transfusion, hemolytic disease of the newborn and autoimmune hemolytic</p>
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	<p>disease. Prerequisite(s): ML2400 <u>SD1630 Working in Health Care</u> This is an introductory course in health care ethics and workplace issues. Through course content, lectures, selected readings and student discussions ethical theories will be examined and applied to current issues that arise in healthcare.</p> <p>Semester 6 (Intersession II*) <u>BL3410 Clinical Microbiology</u> This course is an Introduction to the isolation, identification and reporting of microorganisms isolated from clinical specimens originating from the head and neck, the genito-urinary system and other miscellaneous sources. It is at an intermediate level and is intended to introduce the process of standard techniques and methodologies used to identify common pathogens in a routine clinical microbiology laboratory. Standardization of laboratory techniques, terminology, methods, and reporting will be emphasized. Quality control is incorporated. <u>CH3510 Clinical Chemistry</u> This course introduces students to the theoretical and practical aspects of urinalysis and builds upon previous topics in clinical chemistry. It requires students to apply their pre-requisite knowledge and skills in a simulated hospital laboratory setting. Emphasis is on safe work practices, automated analysis, quality control principles and result interpretation. Prerequisite(s): CH2511 <u>ML2210 Hematology</u> In a simulated hospital laboratory setting, this course requires students to apply their pre-requisite knowledge of Hematology. Emphasis is on routine Hematology tests, procedures and venipuncture as well as interpretation, documentation and reporting of laboratory results. Additionally, safe work practices and quality control principles are reinforced. It also introduces students to automated hematological analysis. Prerequisite(s): Successful completion of semester 5. <u>ML2310 Histology</u> Upon successful completion of this course, the student will be able to carry out the routine techniques performed in a histopathology laboratory. Prerequisite(s): Successful completion of semester 5 <u>ML2510 Transfusion Science</u> This course will provide the student with an intermediate understanding of both the theoretical aspects of the blood group systems and related technological aspects. Prerequisite(s): ML1500 *Courses will be taught in block format (7 days per course).</p> <p>Semester 7** <u>BL3411 Clinical Microbiology</u> This course involves laboratory isolation, identification and reporting of microorganisms from clinical specimens originating from the head and neck, the gastro-intestinal tract, and other miscellaneous sources. It is at an advanced level of understanding and interpretation. It is intended to introduce standard techniques and methodologies used to identify common pathogens in a routine clinical microbiology laboratory. Standardization of laboratory techniques, terminology, methods, and reporting will be emphasized. Quality control and quality assurance is incorporated. Prerequisite(s): Successful completion of semester 6 <u>CH3511 Clinical Chemistry</u> This is a comprehensive course in clinical chemistry that requires students to apply their pre-requisite knowledge and skills in a simulated hospital</p>
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	<p>laboratory setting. Using appropriate safety guidelines, students practice the pre-analytical, analytical and post-analytical phases of the testing process for clinical specimens. Emphasis is on development of technical competence, use of quality assurance principles and applications of critical thinking skills to data interpretation and instrument troubleshooting. It is designed to prepare students to enter the clinical phase of the program at an affiliated hospital. Prerequisite(s): Successful completion of semester 6.</p> <p><u>ML2211 Hematology</u> This is a comprehensive course in Hematology, encompassing the fundamentals and application of information acquired to date in this discipline. Emphasis is on normal and abnormal blood cell morphology, routine coagulation testing as well as interpretation, documentation and reporting of laboratory results. It also introduces the student to a working theory of special hematology stains. Prerequisite(s): Successful completion of semester 6</p> <p><u>ML2311 Histology</u> Students who successfully complete this course will perform processing, embedding, decalcification, section cutting biological staining and coverslipping working independently and as part of the laboratory team. The student will critically evaluate the blocks and slides produced and repeat those which are not of diagnostic quality. Prerequisite(s): Successful completion of semester 6</p> <p><u>ML2511 Transfusion Science</u> This course will provide the student with an advanced understanding of both the theoretical aspects of the blood group systems and related technological aspects. The student will experience a simulated clinical environment and will analyze simulated prenatal, cord, pre-transfusion and posttransfusion blood samples. Following completion of this course the student will have sufficient skills and knowledge to enter the hospital clinical phase of the program. Prerequisite(s): Successful completion of semester 6 **Courses will be taught in block format (3 weeks per course).</p> <p>Semester 8***</p> <p><u>BL4410 Clinical Microbiology</u> This course allows the student to develop technical competence while reviewing theoretical material from previous semesters. The three week hospital rotation will emphasize clinical procedures and acquaint the student with the hospital operation and administration. Prerequisite(s): Successful completion of semester 7</p> <p><u>CH4510 Clinical Chemistry</u> This course allows the student to develop technical competence while reviewing theoretical material from previous semesters. The three week hospital rotation will emphasize clinical procedures and acquaint the student with the hospital operation and administration. Prerequisite(s): Successful completion of semester 7.</p> <p><u>ML3210 Hematology</u> This course allows the student to develop technical competence while reviewing theoretical material from previous semesters. The three week hospital rotation will emphasize clinical procedures and acquaint the student with the hospital operation and administration. Prerequisite(s): Successful completion of all semester 7 courses.</p> <p><u>ML3310 Histology</u> This course allows the student to develop technical competence while reviewing theoretical material from previous semesters. The three week</p>
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	<p>hospital rotation will emphasize clinical procedures and acquaint the student with the hospital operation and administration. Prerequisite(s): Successful completion of all semester 7 courses. <u>ML3510 Transfusion Science</u> This course allows the student to develop technical competence while reviewing theoretical material from previous semesters. The three week hospital rotation will emphasize clinical procedures and acquaint the student with the hospital operation and administration. Prerequisite(s): Successful completion of all semester 7 courses. *** Courses will be taught in block format (3 weeks per course). Students in the 8th semester of the program will be assigned to one of the affiliated hospitals.</p> <p>Semester 9 (Intersession III) <u>SD2610 Interdisciplinary Studies</u> This course concentrates on the integration of knowledge gained in all courses in the program. Students will challenge five comprehensive examinations over the course of the semester; one (1) examination per week. Students will concentrate on analyzing and solving problems involving all disciplines. Prerequisite(s): Pass 8th semester.</p>
Contact	Karen Kennedy, Dean – School of Health Science Tel: (709) 758-7624, Fax: (709) 758-7634 Email: Karen_Kennedy@cna.nl.ca
Current Challenges	

6.3.4 Dawson College – Medical Laboratory Technology

College	Dawson College, 3040 Sherbrooke West, Montreal, Quebec H3Z 1A4 Tel: 524-931-8731 www.dawsoncollege.qc.ca
Program Name	Biomedical Laboratory Technology
Credential	Diploma of College Studies
Duration	3 years
Start	Fall semester only. Fall semester begins at the end of August.
Fees	Tuition is free for Canadian citizens or landed immigrants with permanent residence in Quebec taking at least four courses per semester. A non-refundable \$30 application fee and about \$200 in student fees are charged. Books and supplies cost between \$400 and \$800 per year. Student membership with the Canadian Society for Medical Laboratory Science (CSMLS) is approximately \$40 and l'Ordre professionnel des technologistes médicaux du Québec is approximately \$60. The fee to write the General Certification exam of the CSMLS upon completion of the Program is approximately \$300. Some fees may also apply to vaccinations.
Accreditation	Conjoint Committee on Accreditation, Canadian Medical Association
Licensing of Graduates	National examination set by the Canadian Society of Medical Laboratory Sciences
Partners	McGill University Health Centre Montreal General Hospital Royal Victoria Hospital Montreal Children's Hospital Montreal Neurological Hospital Jewish General Hospital St. Mary's Hospital Centre Lakeshore General Hospital
Entrance Requirements	<p>General Requirements: Admission to cegep is on the basis of the Quebec Diploma of Secondary Studies (DES+), including Secondary V Language, Secondary IV Physical Sciences (416), and Secondary V Mathematics (514 or 526 or 536) or Secondary IV (426 or 436), or an equivalent graduation diploma.</p> <p>Specific Requirements: In addition to the general Ministry of Education requirements above, admission to the Biomedical Laboratory Technology program requires these secondary-level credits: Mathematics 526, Physics 534, and Chemistry 534.</p> <p>College Requirements: An <u>interview</u> is required to assess the candidate's readiness to pursue Biomedical Laboratory Technology studies. Candidates who place below the preparatory level in both English and French will not be admitted into the Program.</p> <p>MEDICAL CERTIFICATES: New students must submit a medical certificate upon entering the Program. There may be some health-related conditions that may have an impact on or possibly prevent future employment in this profession. It is important for you to discuss this with your doctor before beginning the Program.</p> <p>IMMUNIZATIONS: As members of a health care team, medical technologists have a professional responsibility to follow the protocol established by the Department of Public Health for health care workers regarding the prevention of infections. The protocol includes recommendations for immunization against transmissible infections as well screening for tuberculosis. This protocol is extended to students</p>

	<p>interning in a health care establishment. Information is given to students at the time of their admission into the Program. These vaccinations are provided free of charge by the CLSC for students in health care fields. The one exception to this is the Meningitis vaccination, which has just recently become recommended. This is available at the student's cost (approximately \$160).</p>
<p>Admissions Policy</p>	<p>Dawson College Institutional Student Evaluation Policy (2005): The Program Committee develops and recommends specific requirements for admission to the program subject to the College Education Regulations and the College Admission Bylaw.</p> <p>Quebec Ministry of Education: The college education regulations state that candidates must meet four requirements in order to be admitted to a program leading to a diploma of college studies (DEC, for <i>Diplôme d'études collégiales</i>):</p> <ul style="list-style-type: none"> • hold a Secondary School Diploma (SSD) or a Diploma of Vocational Studies (DVS, formerly the Secondary School Vocational Diploma); • have earned the number of credits allotted for certain subjects in the Basic School Regulation for Secondary School Education; • meet any special admission conditions that may be established by the Minister; • meet any special admission conditions established by the college. A college may admit a person whose schooling it deems equivalent. <p>Dawson College Bylaw #7 – Concerning Special Conditions for Admission:</p> <ul style="list-style-type: none"> • <i>In order to ensure that a student is being admitted to a program consistent with his/her interests and aptitudes, the admission process may include tests, interviews, references, and a review of letters of intent or portfolios.</i> • <i>Admission to certain programs may be restricted to applicants with specific minimum overall and/or prerequisite averages.</i> • <i>To meet professional requirements, students admitted to certain programs may be required to submit immunization certificates and/or medical certificates prior to registration.</i> • <i>Before being applied, any special condition must have been submitted to Senate and have received the approval of the Academic Dean.</i>
<p>Program Renewal Policy</p>	<p>Institutional Program Evaluation Policy</p>
<p>Curriculum Model</p>	<p>Instructor lead with a focus on theory and lab as well as clinical experience. The program also has specific requirements for literacy which are integrated into course evaluations:</p> <p>Students in the Biomedical Laboratory Technology Program are expected to develop listening, verbal and written communication skills that are appropriate to the professional practice of medical laboratory science. Students who have not met a minimum level of appropriate communication skills will have great difficulty functioning at a proficient level in the Clinical Internship. Specifically, students in this program must develop the ability: to communicate orally, in a clear and professional manner, in both French and English, with colleagues, other health care workers and patients;</p> <ul style="list-style-type: none"> • to write clearly and concisely in English • to comprehend and follow oral instructions • to comprehend written information, such as reference materials or laboratory protocols; • to identify and minimize possible barriers to communication; • to work in a team environment in a collaborative and cooperative way

	<p>with colleagues and other health professionals;</p> <ul style="list-style-type: none"> • to write analytically • to use informational technology to facilitate communication. <p>Evaluation and assessment</p> <p>The following evaluation tools will be used in different components of the Program (as appropriate) to promote the development and assess the attainment of literacy skills:</p> <ul style="list-style-type: none"> • written portions of lab reports, essays and other course work may include an assessment of literacy (see individual course outlines for details); • team situations may be used and evaluated in laboratory exercises; • reading material from textbooks and laboratory protocols may be assigned and evaluated for comprehension and practical application; • oral communication skills and the ability to comprehend oral instructions will be evaluated through the Professional Technical Competencies in each laboratory of every course; • the Comprehensive Assessment will contain both an English and a French written component; • communication skills will be assessed in the Clinical Internship as part of the professional evaluation of each rotation; • students will produce laboratory reports and projects using appropriate and relevant computer technologies and following the prescribed format; oral presentation may also be required; • the competencies of the General Education component will be assessed through the core courses. <p>Additionally, students must also pass the English exit exam as a DEC requirement.</p> <p>Program specific:</p> <p><u>Attendance Policy</u> - Attendance in the laboratory is compulsory. Any absence must be verified with a medical certificate.</p> <p><u>Comprehensive Assessment</u> – This is completed by Biomedical Laboratory Technology students during their final year of study. The intent of this assessment is to evaluate whether a potential program graduate has acquired the necessary professional skills, knowledge, attitudes, and judgment deemed necessary for entry into the field. It has 3 components: 1) results of the internship evaluations; 2) a written reflection about the internship experience; 3) a multidisciplinary written exam designed to test the situational-analysis and problem-solving skills of the student.</p>
<p>Courses</p>	<p><u>Term 1</u> 101-914-DW Anatomy and Physiology 140-122-DW Laboratory and Professional Practice 140-103-DW Introductory Hematology & Clinical Biochemistry 140-104-DW Laboratory Quality Assurance 345-103-04 Humanities - Knowledge 602-10x-03 French - Block A 603-101-04 English - Components of Discourse</p> <p><u>Term 2</u> 140-221-DW Introductory Microbiology 140-202-DW Histology 140-231-DW Clinical Biochemistry 1 202-914-DW Introductory Organic Chemistry 109-103-02 Phys. Ed. - Health and Physical Education</p>

	<p>345-102-03 Humanities - World Views 603-102-04 English - Literary Genres COM-XX1-03 Complementary</p> <p><u>Term 3</u> 140-302-DW Immunology 140-322-DW Clinical Microbiology 1 140-342-DW Routine Hematology & Hemostasis 140-332-DW Clinical Biochemistry 2 210-914-DW Applied Biochemical Techniques 109-104-02 Phys. Ed. - Physical Activity 602-BXx-03 French - Block B 603-103-04 English - Literary Themes</p> <p><u>Term 4</u> 101-916-DW Introductory Molecular Biology 140-443-DW Special Hematology 140-423-DW Clinical Microbiology 2 140-452-DW Transfusion Science Practices 1 140-433-DW Clinical Biochemistry 3 109-105-02 Phys. Ed. - Active Living 345-BXH-03 Humanities - Block B 603-BXE-04 English - Block B</p> <p><u>Term 5</u> 140-502-DW Histopathological Techniques 140-553-DW Transfusion Science Practices 2 140-503-DW Introduction to Core Laboratory</p> <p><u>Term 6</u> 140-XXX-DW Pharmacology 140-614-DW Histology/Molecular Biology Stage 140-644-DW Hematology/Hemostasis/Procurement Stage 140-634-DW Clinical Biochemistry Stage 140-624-DW Clinical Microbiology Stage 140-654-DW Transfusion Science Stage</p>
<p>Course Descriptions</p>	<p>101-914-DW Anatomy and Physiology This course concentrates on characterizing anatomical and physiological information in terms of evaluating the factors contributing to homeostasis (the maintenance of equilibrium in the body). Emphasis is placed on the correct interpretation of homeostatic principles and physiological phenomena related to homeostasis. <i>3 hours theory, 2 hours lab per week.</i></p> <p>140-122-DW Laboratory and Professional Practice This course combines the development of both basic laboratory skills and professional attitudes and behaviour as an introduction to the profession. Safe work practices are introduced, including universal precautions, responsible handling and storage of chemicals and biological products, as well as appropriate reactions to emergency situations. Students learn protocols for preparing solutions, calculating quantities, weighing, pipetting and making dilutions. Students also learn about the scope of the biomedical laboratory technologist's job and different types of laboratories in which they work. Emphasis is placed on the skills and behaviours needed for this profession, including interacting with patients. An introduction to procuring different types of patient specimens is presented. <i>3 hours theory, 3 hours lab per week.</i></p> <p>140-103-DW Introductory Hematology & Clinical Biochemistry Students are introduced to preparation and analysis of blood and other</p>

	<p>samples for hematological and biochemical assays. Normal blood cells are examined via cell counts and morphology. Clinically significant biochemical constituents (such as carbohydrates) are measured and correlated with certain diseases (such as diabetes). Both manual and automated diagnostic techniques are introduced, and students learn the use and maintenance of appropriate instruments and equipment, including computers (i.e., laboratory information systems). <i>2 hours theory, 2 hours lab per week.</i></p> <p>140-104-DW Laboratory Quality Assurance The objective of this course is for students to develop skills in performing activities related to quality assurance in the context of the pre-analytical, analytical, and post-analytical phases of laboratory services. Students learn basic statistical principles used in validating laboratory results through internal quality control programs. Emphasis is placed on the interpretation of quality control results and corrective action. Students train directly on computers in processing quality control data. <i>2 hours theory, 2 hours lab per week</i></p> <p>140-221-DW Introductory Microbiology This course focuses on the correct identification of prokaryotic microorganisms (fungi and protozoa). Techniques include isolation, enumeration and description of cellular components, using appropriate chemicals and equipment (such as the microscope). Attention is paid to understanding potential risks associated with frequently encountered microorganisms, maintenance of sterile conditions, physical and chemical methods for controlling microorganisms, and safe handling and proper management of contaminated material. <i>1 hour theory, 3 hours lab per week.</i></p> <p>140-202-DW Histology In this course, students learn microscopic and macroscopic techniques for examining cells, tissues and organs, according to anatomical, morphological and physiological characteristics. Proper choice, use, and maintenance of microscopes are covered. <i>2 hours theory, 2 hours lab per week.</i></p> <p>140-231-DW Clinical Biochemistry 1 This course covers techniques in clinical biochemical assays, using the appropriate analytical instruments and equipment to measure constituents of blood and biological fluids. Methods for determination of lipids, proteins and enzymes are introduced and correlated with disease processes. Principles of sample and reagent preparation, automation, instrument preparation, use and maintenance, calibration, quality control, and recording and interpretation of results are included. <i>2 hours theory, 2 hours lab per week.</i></p> <p>202-914-DW Introductory Organic Chemistry The objective of this course is to introduce students to the identification of organic molecules. Methods of purification and separation of organic molecules are included. The functional groups are presented in terms of nomenclature, chemical bonds and Lewis structures, physical properties, and chemical reactions. This is related to future topics in biochemistry and histotechniques. <i>3 hours theory, 2 hours lab per week.</i></p> <p>140-302-DW Immunology The focus of this course is techniques in immunological analysis, including microscopy, cytometry (cell counting), nephelometry, turbidimetry and immunoassays. Cells of the immune system are enumerated and identified, both by automated analysis and on stained smears. Techniques for identifying antigens and antibodies, antigen-antibody reactions, and variables affecting immunological reactions are covered. <i>2 hours theory, 3 hours lab per week.</i></p> <p>140-322-DW Clinical Microbiology 1 This course deals with the isolation, culture and identification of microorganisms in the laboratory. Topics include morphological</p>
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	<p>characteristics, biochemical and serological tests, detection kits, and computer verification. Detection of microbiological contaminants, along with the correct application of decontamination and control methods for microorganisms, are also covered. <i>1 hour theory, 3 hours lab per week.</i></p> <p>140-342-DW Routine Hematology & Hemostasis In this course, students study analysis of blood specimens and other biological fluids in the hematology and hemostasis laboratories. Correct performance of cells counts is included, using both manual and automated methods, along with staining, microscopy, and other routine techniques. Students learn skills associated with manual and automated techniques used for detecting the components of blood coagulation (hemostasis) and associated disorders. Related bedside testing is also covered. Results are validated, recorded, reported, and monitored, and quality control standards are applied. Correct interpretation of normal and abnormal results plays an important role. <i>2 hours theory, 2 hours lab per week.</i></p> <p>140-332-DW Clinical Biochemistry 2 Students develop their skills in the biochemistry laboratory using analytical instruments for determination of hemoglobin, bilirubin, iron, liver function tests, blood gases, pH, electrolytes (including calcium and magnesium), and osmolality. Students explore biochemical diagnosis techniques, including preparing reagents and solutions, calibration, computer recording of data, understanding and management interferences, operation and maintenance of equipment, and application of an effective quality control program. <i>2 hours theory, 2 hours lab per week.</i></p> <p>210-914-DW Applied Biochemical Techniques This course explores techniques for extracting, separating and assaying carbohydrates, lipids and proteins from biological samples. Students learn separation and differentiation of biomolecules using electrophoresis, gas chromatography, high pressure liquid chromatography (HPLC), infrared spectrophotometry, atomic absorption spectroscopy, and nuclear magnetic resonance (NMR). Correct operation and maintenance of these instruments is also included. <i>1 hour theory, 2 hours lab per week.</i></p> <p>101-916-DW Introductory Molecular Biology The objective of this course is to introduce students to basic molecular genetics and present the principles of extraction, hybridization and characterization of DNA from biological samples and cells. Students also become familiar with chemicals and apparatus used for amplification of DNA using polymerase chain reaction (PCR). <i>2 hours theory, 1 hour lab per week.</i></p> <p>140-443-DW Special Hematology This course deals with analysis of samples obtained from patients with hematological disorders, including anemias and leukemias. Students continue to use appropriate instruments and analytical methods used for the diagnosis of hematological diseases. Emphasis is placed on correct interpretation and follow-up of normal and abnormal results, and the precise correlation of results with clinical information. <i>2 hours theory, 2 hours lab per week.</i></p> <p>140-423-DW Clinical Microbiology 2 Students develop skills in processing patient samples in the microbiology laboratory in order to identify pathogenic microorganisms (bacteria, viruses, fungi, yeasts and parasites). Techniques include microscopic examination and staining, choosing appropriate plating media and growth conditions, and biochemical tests (both manual and automated). Students also learn to apply antibiotic sensitivity tests effectively. Appropriate follow-up is covered, including exact recording and reporting of results, as well as rigorous monitoring of quality control results. <i>2 hours theory, 3 hours lab per week.</i></p> <p>140-452-DW Transfusion Science Practices 1</p>
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	<p>The focus of this course is for students to learn to process samples involved in blood transfusions. Topics include immunological principles in antigen-antibody reactions, blood group systems, antibody identification techniques, and routine pre-transfusion and compatibility testing and problem-solving. Students adhere to rigorous standards of data processing and record-keeping, interpretation and reporting of results, and quality control in the transfusion service laboratory. <i>2 hours theory, 2 hours lab per week.</i></p> <p>140-433-DW Clinical Biochemistry 3 Students continue to develop expertise in performing biochemical and immunological assays and precise measurement of clinically significant biochemical constituents of biological fluids. Non-protein nitrogenous compounds, kidney function tests, urinalysis, vitamins, hormones, tumoural markers, toxic substances, and therapeutic drug monitoring are included. Emphasis is placed on correct interpretation and reporting of normal and abnormal results. <i>2 hours theory, 2 hours lab per week.</i></p> <p>140-502-DW Histopathological Techniques This course involves preparation of surgical and autopsy specimens for anatomical examination. Procedures covered include grossing, fixation and decalcification, embedding, sectioning, mounting, and routine and special staining for microscopic examination of human tissues. Techniques of in-situ hybridization and immunohistochemistry are also explored. Students learn to manage materials and troubleshoot methods used in the histology laboratory. <i>3 hours theory, 4 hours lab per week.</i></p> <p>140-553-DW Transfusion Science Practices 2 Students continue to develop expertise in transfusion practices by learning to manage blood inventories and to prepare blood and blood products for transfusions. Solutions to problems related to transfusions, such as ABO discrepancies, transfusion reactions, hemolytic disease of the newborn, and autoimmune hemolytic anemias, are explored. Students learn to correlate laboratory results with patients' clinical information. <i>3 hours lab per week.</i></p> <p>140-503-DW Introduction to Core Laboratory Many hospitals have a core laboratory where clinical testing in biochemistry, hematology and microbiology are incorporated in the same work area. In this course, students learn to process, distribute and store patient samples for different analyses in the core laboratory, and to perform all relevant diagnostic testing and follow-up in each of the core laboratory disciplines. Emphasis is placed on how laboratory results correlate with disease profiles (e.g. kidney, liver, heart, pancreas). Correct interpretation of normal and abnormal results plays an important role, and students also learn to manage inventory. Multidisciplinary case studies are analyzed and discussed in a seminar block. <i>5 hours theory, 6 hours lab per week.</i></p> <p>140-XXX-DW Pharmacology This course prepares biomedical technologists to respond to new responsibilities which are the result of changes in the <i>Code des professions du Quebec</i>. Biomedical laboratory technologists are now able to administer medications and other substances in the context of performing certain types of laboratory analysis. This course provides students with a foundation for understanding principles of absorption, transformation and elimination of medications, as well as interactions and toxic effects. Students will learn how to intervene in the case of an adverse reaction following the administration of a medication or other substance. <i>3 hours lecture per week.</i></p> <p>Clinical Internship in Hospitals in Term VI/Year 3 Prerequisites: completion of all requirements of the first 5 semesters of the Biomedical Laboratory Technology program. Students intern in affiliated hospitals in the following laboratory departments: biochemistry, microbiology, hematology, hemostasis, histology and transfusion science.</p>
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	<p>Additional rotations include molecular biology and procurement. The entire internship encompasses 26 weeks. This practical experience allows students to perfect their skills and complete their training in the actual environment where most medical technologists choose to work.</p> <p>140-614-DW Histology/Molecular Biology Stage 140-644-DW Hematology/Hemostasis/Procurement Stage 140-634-DW Clinical Biochemistry Stage 140-624-DW Clinical Microbiology Stage 140-654-DW Transfusion Science Stage</p>
Contact	<p>Karen Gabriele, Program Coordinator Email: kgabriele@dawsoncollege.qc.ca</p>
Current Challenges	

6.3.5 Northern Alberta Institute of Technology – Medical Laboratory Technology

College	Northern Alberta Institute of Technology (NAIT) 11762 - 106 Street, Edmonton, Alberta, Canada T5G 2R1 (780) 471-7400 www.nait.ca
Program Name	Medical Laboratory Technology
Credential	Diploma
Duration	2 years (39 weeks at NAIT followed by 42 weeks of clinical laboratory training)
Start	August
Fees	Tuition - \$6618.40 Books & Program Fees - \$4736 Health & Dental - \$412 SA Fee - \$410 Technology Fee - \$212
Accreditation	Conjoint Committee on Accreditation, Canadian Medical Association
Licensing of Graduates	National examination set by the Canadian Society for Medical Laboratory Science (CSMLS)
Partners	<ul style="list-style-type: none"> • Capital Health Authority (Edmonton) • University of Alberta Hospitals • Vancouver Island Health Authority • Prince George Regional Hospital • Victoria General Hospital • Dynacare Kasper Medical Laboratories • Royal Columbian Hospital • Fraser Health Authority • Nanaimo Regional General Hospital • Red Deer Regional Hospital • Queen Elizabeth II Hospital (Grande Prairie)
Entrance Requirements	<p>60% or better in Biology 30, Chemistry 30, English Language Arts 30-1, and Pure Math 30.</p> <p>Applied Math 30 combined with one of the following courses will be accepted in lieu of Pure Math 30; Transitional Mathematics 101, or Algebra 35 with a competency level of 65%.</p> <p>Note: Applicants to the Medical Laboratory Technology program must submit a <u>Career Investigation</u> report with their application. The Career Investigation report recommends attendance at a NAIT program information session as well as a tour of a hospital laboratory and attendance at a career fair or a meeting with an academic counselor. The report has 11 items two of which ask for: 1) the applicant's understanding of the role of a medical laboratory technologist and types of testing done in each of the different laboratory department; and 2) the personal qualities the applicant possesses which suit her/him to the profession.</p> <p>Non-academic Requirements A student accepted into the Medical Laboratory Technology Program is required to be immunized for Hepatitis B. This service will be provided by NAIT Health Services upon commencement of the program. An administrative fee may be charged for this service. This will be confirmed at program commencement. The Medical Laboratory Program requires that students have documented proof of 2 red measles vaccinations or documented proof of immunity. Persons born before 1970 are considered to have had the disease and therefore have immunity. A "2 Step" baseline TB skin test will be administered by Health</p>

	<p>Services following the commencement of the program at NAIT. Two skin tests are given 1 to 3 weeks apart and must be "read" 48-72 hours later. NAIT Health Services will review history of previous exposure, previous skin tests, chest X-ray, or BCG vaccination. Students who have already completed the "2 Step" test, will be given a single TB test prior to practicum placement. All vaccinations must be completed prior to commencing into Year II of the program.</p> <p>Prior to completion of the first year of the program, the student may be required to have a current First Aid and CPR (Level C) certificate. A criminal record check clearance may be required at some clinical training sites</p> <p>Selection Criteria Student selection is highly competitive and is based on criteria that may include academic achievement beyond the minimum prerequisites identified in the NAIT calendar or application form. Last year, successful applicants had a competitive average of approximately 80% in the prerequisite courses. The competitive average range fluctuates yearly based on the number of applications received.</p> <p>All applicants are encouraged to obtain a high school diploma as some employers may still require a high school diploma. Applicants with a credential in another NAIT Health Science Program may be given some preference in the selection process.</p> <p>The following outlines the student selection process:</p> <ol style="list-style-type: none"> 1. Pre-requisite course compliance will be reviewed by the NAIT Registrar's Office. 2. Short listing will occur based on academic standing (average of the course prerequisites). Consideration is also given to applicants with prior NAIT Health Sciences credentials and/or residency in an affiliated health care region. 3. Final Selection will be based as follows: <ul style="list-style-type: none"> • Academics 30% • Career Investigation Report 30% • Interview 40%
<p>Admissions Policy</p>	<p>NAIT Academic Regulations and Procedures (2006) [excerpts]: ADMISSION REQUIREMENTS: All applicants should be 16 years of age or older, except individuals applying solely for courses intended for younger students. Exceptions may be approved by the appropriate Dean.</p> <p><u>English Language Proficiency:</u> As English is the primary language of instruction in all programs at NAIT, an adequate knowledge of written and spoken English is a prerequisite for admission. Other language requirements may be a prerequisite for some other programs. Regardless of country of origin or of citizenship status, all applicants must demonstrate proficiency in the English language prior to acceptance.</p> <p>This requirement may be demonstrated as follows: Successful completion of the specific named prerequisite English course or an approved alternative English course deemed to be equivalent to the specific English requirement PLUS a minimum of three (3) years of full-time education in English in Canada or in a country where English is the principal language.</p> <p>Applicants not designated as meeting the above requirement shall be required to present successful completion of the specific named prerequisite English</p>

	<p>course or an approved alternative English course deemed to be equivalent to the specific English requirement PLUS a satisfactory assessment by the NAIT English as a Second Language Department or a satisfactory score on the Test of English as a Foreign Language (TOEFL) or equivalent. Some programs may also require a satisfactory score on the Test of Spoken English (TSE), which may be shown by the TSE examination or other acceptable test.</p> <p><u>Academic Requirements:</u> Prerequisites are determined to provide the best opportunity for success in the student's chosen program and career. Specific grade and subject requirements are listed in the current NAIT calendars. Selection criteria in addition to program prerequisites may be prescribed, as noted in these Regulations and Procedures.</p> <p>High school graduation is not required by NAIT. However, some employers and post secondary institutes may require high school graduation as a condition of employment or an entry requirement. Specific subject prerequisites are still required to be considered for NAIT programs. (Refer to the current Application Form). All other program admission requirements will continue to apply.</p> <p><u>Medical Questionnaire and NAITSA Medical Insurance:</u> A medical examination is not required for admission to NAIT, but NAIT does reserve the right to require a student to submit a medical certificate at any time. ... Full-time students are required to participate in the compulsory insurance program as managed by the NAIT Students' Association prior to commencement of their program of study. The NAIT Students' Association has authority for exempting entire academic programs or students from the insurance program. Students may also opt out of the compulsory insurance program if they can provide documented proof at the time of registration that they are covered under another insurance program. Fees payable for insurance coverage are payable with the student's tuition fees.</p> <p><u>Color Vision and Hearing:</u> Certain types of laboratory and/or shop work require normal hearing and color vision. Deficient hearing or color vision may affect the student's ability to perform course work or to gain employment after graduation. Color vision and hearing tests are available free at NAIT Health Services.</p> <p>SELECTION FOR ADMISSION: <u>Program/Course Quotas:</u> All programs/courses at NAIT are subject to quota limitations based on an assessment of employment opportunities and available NAIT resources.</p> <p><u>Selection Criteria:</u> NAIT reserves the right to determine criteria for selection in all of its programs/courses. Student selection in oversubscribed programs may be based on academic achievement beyond the prerequisites identified in the calendar, written career investigation, personal interview, relevant work experience, and demonstrated commitment to the career field. In the case of applicants who have relevant post-secondary education, selection will be based on high school grades or relevant post-secondary grades, whichever are higher, subject to maintaining appropriate accessibility to both high school graduates and those with postsecondary experience.</p>
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	<p>Selection criteria used in the previous academic year are available on the current application form, the website or by contacting the Registrar's office. Operationally, selection will normally focus on achievement at the prerequisite level or relevant post-secondary level.</p> <p>NAIT may use <u>interviews</u> for student selection in certain circumstances. Applicants may be interviewed to obtain additional information or to clarify/verify some aspect of the application. Such circumstances are to be reviewed and approved by the Dean.</p> <p><u>Programs with External Selection Mechanisms:</u> Selection committees established by the cooperating hospitals conduct selection of applicants to a number of medical and health science programs. Applications to these programs shall be submitted to NAIT. The Registrar's Office checks prerequisites and determine applications that are acceptable to be forwarded to the external selection committee.</p>																								
<p>Program Renewal Policy</p>																									
<p>Curriculum Model</p>	<p>Instructor lead with lectures, labs, and clinical experience. Two years (39 weeks at NAIT followed by 42 weeks of clinical laboratory training).</p> <p>Classroom and Study Hours: Average number of hours in classroom per week: Semester 1: 35 hours/week; Semester 2: 34 hours/week</p> <p>Average number of hours a student can expect to study outside of class: 15-20 hours per week</p> <p>The clinical practicum encompasses the theory and practical components of Specimen Collection, Transfusion Medicine, Histotechnology, Hematology, Clinical Chemistry, and Diagnostic Microbiology. It includes a comprehensive review of the student's theoretical knowledge through workshops, worksheets, case studies and exams. This may vary with each clinical site. During Practicum (Semester 3 and 4) students can expect to work an average of 40 hours per week (hours may include early or late shifts and some weekends).</p> <p>Length: Students work 7.75 hours per day, 5 days per week, for 42 weeks during their clinical placement. Clinical for Semester 3: August - December Clinical for Semester 4: December to April/May</p>																								
<p>Courses and Course Descriptions</p>	<table border="1"> <thead> <tr> <th>Course ID</th> <th>Name</th> <th>Hours</th> <th>Credits</th> </tr> </thead> <tbody> <tr> <td colspan="4">Semester 1</td> </tr> <tr> <td>HSC104</td> <td>Medical Terminology (TLM)</td> <td>17</td> <td>1.0</td> </tr> <tr> <td colspan="4">This course is designed to familiarize the student with the terminology used in Health and Medical Sciences.</td> </tr> <tr> <td>HSC105</td> <td>Infection Control and Safety</td> <td>22</td> <td>1.5</td> </tr> <tr> <td colspan="4">This course deals with transmission of microorganisms, immunization practices for healthcare workers, blood-borne pathogens (Hepatitis and HIV), standard precautions, isolation procedures, sterilization and disinfection, safety and WHMIS.</td> </tr> </tbody> </table>	Course ID	Name	Hours	Credits	Semester 1				HSC104	Medical Terminology (TLM)	17	1.0	This course is designed to familiarize the student with the terminology used in Health and Medical Sciences.				HSC105	Infection Control and Safety	22	1.5	This course deals with transmission of microorganisms, immunization practices for healthcare workers, blood-borne pathogens (Hepatitis and HIV), standard precautions, isolation procedures, sterilization and disinfection, safety and WHMIS.			
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MLT101	Specimen Collection/Handling	32	2.0	Information required for the collection, handling and transportation of various laboratory specimens to help ensure the quality of laboratory results will be covered. Emphasis will be on the collection of blood specimens, and practice in venous collection on adults and capillary collection will be provided.
MLT102	General Laboratory Practice	42	2.5	The theory and practice required to perform basic procedures in a laboratory will be presented. Laboratory glassware, pipettes, use of balances, centrifuges, thermal equipment, microscopes and solution preparation with related calculations will be covered.
MLT103	Anatomy & Physiology	85	5.0	This course consists of twenty-two modules that have been designed to develop an understanding of the structure and function of organs and systems in the normal human body. A study of basic chemical principles is included. Medical terminology is expanded and pathology is introduced. This course is intended to extend the learner's prior knowledge of high school biology and provide background awareness of the human body in health and disease.
MLT111	Quality Management	17	1.0	This course is designed to provide a complete overview of methods used to ensure quality patient care. The emphasis will be on quality assurance and quality control techniques.
MLT211	Analytical Principles I	51	3.0	The principles commonly used for quantitative analysis in clinical laboratories will be covered. Principles and applications of light measuring systems, electrochemistry and enzymology will be discussed.
MLT212	Analytical Principles II	51	3.0	This course is designed to follow Analytical Principles I. It will introduce the student to the principles and applications of light scatter, electrophoresis, chromatography and immunoassay.
MLT215	Urinalysis	38	2.0	This course presents the theory and techniques for chemical testing, microscopic sediment examination and evaluation of physical properties of urine. Result correlation and clinical significance of results are discussed.
MLT220	Histotechnology I	59	3.5	An introduction to the principles and practices of preparing clinical specimens for histological examination, including fixation, decalcification processing, embedding and microtomy will be presented.
MLT221	Histology	36	2.0	This course will provide an introduction to the functional classification of cells and tissue arrangements, followed by the microanatomical structure of the major organs of the body.
MLT222	Histotechnology II	63	4.0	This course will provide an overview of the techniques used to determine cellular and non-cellular components for microscopic examination.
MLT260	Microbiology I	114	7.0	Bacteria, as biological entities, are studied. Emphasis is on morphological, physiological and disease-producing properties, and methods of isolation and identification. Laboratory exercises provide practical experience and complement the theory.
Semester 2				
MLT100	Professional Practices	34	2.0	This course uses a "blended learning style" of educational instruction. It uses both WebCT and classroom instruction while introducing the learner to the importance of effective interpersonal communication skills and team work. The

	diverse needs and human relations posed by health care clients are also explored. Students will also analyze their personal effectiveness related to wellness and stress management.		
MLT104	Immunology	24	1.5
	This course is a study of the body's defense mechanisms, both innate and acquired. The involvement of the immune system in various disease states and clinical conditions are also discussed. The student is introduced to the principles of antigen-antibody reactions and their application in many laboratory tests.		
MLT201	Hematology & Coagulation I	80	5.0
	This course is a study of the production and function of the normal blood cells (erythrocytes, leukocytes and platelets) and of some of the procedures performed routinely in the clinical laboratory, such as the use of small hematology analyzers and the evaluation of blood films. The course also includes the basic theory and routine tests for coagulation.		
MLT202	Hemopathology - Erythrocytes	44	2.5
	This course is a study of the pathophysiology of various anemias as related to the laboratory involvement in diagnosis and treatment. Special tests used for differential diagnosis are included. This information is applied to the detection of analytical discrepancies and ensuring timely, valid results.		
MLT203	Hemopathology - Leukocytes	44	2.5
	The pathophysiology of blood diseases involving leukocytes as related to the laboratory involvement in diagnosis and treatment will be studied. Special tests used for differential diagnosis are included. This information is applied to the detection of analytical discrepancies and ensuring timely, valid results.		
MLT213	Clinical Chemistry I	87	5.0
	This course will provide the knowledge and skills required to perform selected tests for carbohydrates, electrolytes, enzymes, and renal and liver functions.		
MLT214	Clinical Chemistry II	73	4.0
	The knowledge and skills required to perform more advanced testing for electrolyte, enzyme, renal and liver function procedures will be covered. Additional knowledge and skills will be provided for proteins, therapeutic drugs, drugs of abuse, and endocrine testing.		
MLT215	Urinalysis	38	2.0
	This course presents the theory and techniques for chemical testing, microscopic sediment examination and evaluation of physical properties of urine. Result correlation and clinical significance of results are discussed.		
MLT216	Molecular Biology	23	1.5
	This course provides the student with the principles of molecular biology techniques and demonstrates the practical applications of this technology in a diagnostic laboratory. Topics include, but are not limited to, DNA/RNA isolation, hybridization, Polymerase Chain Reaction, and restriction enzyme analysis.		
MLT223	Transfusion Medicine	147	9.0
	This course involves the study of red cell blood group systems as they apply to the testing of blood for transfusion purposes. The detection, treatment and prevention of Hemolytic Disease of the Newborn is also covered. Laboratory exercises provide practical experience and complement the theory.		
MLT261	Microbiology II	154	9.0
	This course is a continuation of Microbiology I.		
Semester 3			
MLT200	Management Practices	16	1.0
	This WebCT course provides the study of health care organizational behaviour. It will expose the student to the skills required for supervisory/management positions within laboratory medicine.		
MLT313	Transfusion Medicine, Theory	48	3.0
	This course reviews and expands the student's theoretical knowledge of transfusion science through case studies, worksheets, assignments, and		

	<p>exams.</p> <p>MLT314 Transfusion Medicine, Practicum 145 4.5 This course covers the practical component of transfusion science through work experience in a clinical laboratory. This course runs concurrently with MLT313 - Transfusion Medicine, Theory.</p> <p>MLT321 Histotechnology, Theory 48 3.0 This course reviews and expands the student's theoretical knowledge of histotechnology through case studies, worksheets, assignments, and exams.</p> <p>MLT322 Histotechnology, Practicum 145 4.5 This course covers the practical component of histotechnology through work experience in a clinical laboratory. This course runs concurrently with MLT321 - Histotechnology, Theory.</p> <p>MLT430 Hematology, Theory 97 6.0 This course reviews and expands the student's theoretical knowledge of hematology through case studies, worksheets, assignments, and exams.]</p> <p>MLT431 Hematology, Practicum 290 8.5 This course covers the practical component of hematology through work experience in a clinical laboratory. This course runs concurrently with MLT430 - Hematology, Theory.</p> <p>Semester 4</p> <p>MLT310 Blood Collection, Practicum 78 2.5 Students will practice the collection, handling, transportation, and processing of various laboratory specimens to help insure the quality of laboratory results. Emphasis will be on the collection of blood specimens, and practice in venous collection on adults and capillary collection will be provided.</p> <p>MLT432 Clinical Chemistry, Theory 97 6.0 This course reviews and expands the student's theoretical knowledge of clinical chemistry through case studies, worksheets, assignments, and exams.</p> <p>MLT433 Clinical Chemistry, Practicum 290 8.5 The course covers the practical component of clinical chemistry through work experience in a clinical laboratory. This course runs concurrently with MLT432 - Clinical Chemistry, Theory.</p> <p>MLT441 Microbiology, Theory 97 6.0 This course reviews and expands the student's theoretical knowledge of microbiology through case studies, worksheets, assignments, and exams.</p> <p>MLT442 Microbiology, Practicum 290 8.5 This course covers the practical component of microbiology through work experience in a clinical laboratory. This course runs concurrently with MLT441 - Microbiology, Theory.</p>
Contact	<p>Melody Stewart, Diagnostic Laboratory Administrative Support (780) 471-7662 E-mail: melodys@nait.ca</p> <p>Ellen Hughes, B.Sc., M.Ed, Dean - School of Health Sciences Email: ellenh@nait.ca</p>
Current Challenges	

6.3.6 Michner Institute – Medical Laboratory Science

College	Michener Institute 222 St. Patrick Street, Toronto, ON M5T 1V4 Tel: (416) 596-3101, Toll free: 1-800-387-9066 www.michener.ca
Program Name	Medical Laboratory Science
Credential	Advanced Diploma
Duration	2.5 years (25 months)
Start	September
Fees	\$4,500 per year - Tuition fees are based on 2006/07 figures and are subject to change for the 2007/08 academic year
Accreditation	Conjoint Committee on Accreditation, Canadian Medical Association
Licensing of Graduates	National examination set by the Canadian Society of Medical Laboratory Sciences
Partners	<ul style="list-style-type: none"> • Credit Valley Hospital, Mississauga • Hospital for Sick Children, Toronto • Humber River Regional Hospital • Huron Perth Healthcare Alliance Stratford General Hospital Site • Lakeridge Health Corporation, Oshawa Division, Oshawa • London Laboratory Services Group • Mount Sinai Hospital, Toronto • North York General Hospital, Toronto • Peterborough Regional Health Centre, Peterborough • Royal Victoria Hospital, Barrie • Scarborough Hospital, General Division, Scarborough • Southlake Regional Health Centre • St. Joseph's Health Centre, Toronto • St. Michael's Hospital, Toronto • Stratford General Hospital • Sunnybrook & Women's College Health Sciences Centre, Toronto • Toronto East General & Orthopaedic Hospital • Toronto Medical Laboratories, Toronto • Trillium Health Centre, Mississauga • William Osler Health Centre, Brampton Memorial Site, Brampton
Entrance Requirements	<p>Admission Requirements:</p> <ul style="list-style-type: none"> • Ontario Secondary School Diploma: • Four grade 12 University (U) level courses: <ul style="list-style-type: none"> ○ Grade 12 English (U) ○ Grade 12 Mathematics (U) ○ Grade 12 Chemistry (U) ○ Grade 12 Biology (U) OR Physics (U) (Biology is strongly recommended) • Two University (U) or University/Mixed (U/M) level courses • A minimum grade of 60% in each of the courses <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Ontario Secondary School Diploma • A minimum of six OAC courses, including: <ul style="list-style-type: none"> ○ OAC English ○ OAC Mathematics ○ OAC Chemistry

	<ul style="list-style-type: none"> ○ OAC Biology OR Physics (Biology is strongly recommended) ● A minimum grade of 60% in each of the six courses <p>Applicants for whom English is a second language must provide proof of an English language assessment. Since all lectures, seminars, and clinical laboratory sessions are conducted in English, an adequate knowledge of written and spoken English is essential for student success. This requirement of proficiency in English may be satisfied by passing ONE of the tests listed below.</p> <ul style="list-style-type: none"> ● ENG4U/Grade 12-University Prep English course. Student must have a mark of 60% or greater to pass. ● International English Language Testing System (IELTS). The scoring for IELTS is an overall score of 6.5 with all components (bands) of the test being at a 6 or above. ● Michigan English Language Assessment Battery (MELAB) Candidates must achieve an over all score of 85,with all portion scores at 80 or above. ● Certificate of Proficiency in English (COPE). An overall score of 5 is required with 2 in writing and 1 or 2 in the reading and listening sessions. ● Test of English as a Foreign Language (TOEFL) and Test of Written English (TWE). The scores required for TOEFL are a minimum TOEFL score of 92 (iBT) with a minimum of 21 on the Writing Section or 237 (computer) or 580 (written) and TWE of 4.5. <p>Each program offered by Michener has a fixed size, reflecting labour market demand and clinical education spaces. Therefore enrollment in programs is limited, and <u>admission can be very competitive</u>.</p>
<p>Admissions Policy</p>	<p>General Admission Information</p> <p>Each program offered by Michener has a fixed size, reflecting labour market demand and clinical education spaces. Therefore enrollment in programs is limited, and admission can be very competitive. Selection of applicants may be based on a combination of academic grades, interview mark, continuing education, references, and/or other selection criteria. For some programs, a rolling admission process may apply.</p> <p><u>Admission Scores</u>: Acceptance will be based on an admission score. The admission score is made-up of a combination of:</p> <ul style="list-style-type: none"> ● Prerequisite course marks ● Average grade or grade point ● Interview score (if applicable) <p>Limited enrollment makes it impossible to accept all those who have met the minimum requirements, thus applicants to some programs are asked to submit additional information, such as:</p> <ul style="list-style-type: none"> ● Proof of professional affiliation ● Work experience ● Confidential references (forms provided by Michener) ● Relevant continuing education details ● and/or other program-specific selection criteria <p><u>Admission Limitations</u> - Possession of the published minimum requirements does not guarantee admission, and The Michener Institute reserves the right to accept, defer, rescind or refuse admission of any applicant to a program, and to cancel any program where sufficient enrollment is not obtained or employment opportunities appear inadequate.</p>

	<p><u>Police Reference/Vulnerable Person Check</u> - Programs at The Michener Institute require all first-year and students going to clinical to complete a Police Record/ Vulnerable Persons Check (VPC) through OESC, as students will have direct contact with vulnerable persons. Depending upon clinical start date, students may be required to renew their VPC.</p> <p>Academic Policies:</p> <p><u>Promotion</u> - The usual pass mark is a minimum grade of 60% (C-) in each course or a value of "Pass." Some courses require a higher level of achievement (refer to the course outlines provided at the beginning of each semester).</p> <p><u>Clinical Placements</u> - It is not always possible to place students in the site of their choice. Applicants, when confirming acceptance into a program, agree to attend any placement site that Michener arranges. These placements may be anywhere in Ontario or, for some programs, across Canada. Students in a placement site outside Ontario may be required to sign a liability waiver and purchase additional insurance coverage should workers' compensation legislation not cover the placement. Regardless of location, students are required to pay all the costs associated with their placement (housing, travel, etc.).</p> <p><u>Attendance</u> - Attendance in all laboratory and clinical sessions is mandatory. Course outlines will identify the specific attendance policy. Failure to attend scheduled laboratory and clinical sessions, except where supported with documentation of unavoidable cause, may result in the awarding of a failing grade for that course, and may result in termination from the program. Termination may occur at any point during the academic session.</p> <p>Note: There was no specific policies covering admissions or programming on the webpage.</p>
<p>Program Renewal Policy</p>	<p>All colleges in Ontario must submit programs to the Credential Validation Service of Colleges Ontario (formerly Association of Colleges of Applied Arts and Technology of Ontario). The CVS assesses each submission to ensure it follows ministerial guidelines for college level courses. Specifically, CVS looks for learning outcomes at a level suitable for the credential sought, generic skills (i.e. employability skills), and general education courses specific to each program, but broad enough to ensure graduates have liberal education skills/knowledge.</p> <p>Michener Institute's program review policy is not on its webpage.</p>
<p>Curriculum Model</p>	<p>The Michener Institute introduced a new curriculum for allied health in 2006. The curriculum model has 3 components:</p> <ol style="list-style-type: none"> 1) <u>interprofessional education</u> which is intended to foster collaboration among health care providers by "building greater knowledge of and respect for the roles of other professionals, enabling the learner to find common ground and recognize boundaries when focusing on patient care; 2) <u>simulation education</u> which is seen as a complement to clinical education and is intended to mirror clinical practice, but in a safe and controlled environment. "In Interprofessional Simulation scenarios, students have the opportunity to hone their skills in communication, critical thinking, crisis management, and collaboration while leveraging their technical and interprofessional skills to enhance patient safety and quality of care." 3) <u>health care competency assessment</u> which is focused on "discipline specific and interprofessional skills, as well as the attitudes and behaviours required of a health care professional prior to entering the clinical environment."

	The Michener curriculum model has 4 related elements: 1) Admissions Profile; 2) Outcomes; 3) Readiness for Clinical Education; and 4) Graduate Profile.
Courses	<p>Semester 1 - Fall APLM111 The Human Body BAIP110 Foundations of Interprofessional Collaboration I CCML111 Clinical Chemistry I HEML111 Introduction to Hematology HIML110 Introduction to Histology MIML113 Microbiology and Immunology</p> <p>Semester 2 - Winter BAIP120 Foundations of Interprofessional Collaboration II HEML120 Hematology and Hemostasis HIML122 Microanatomy INML120 Clinical Instrumentation MIML121 Applied Microbiology VPML120 Specimen Procurement</p> <p>Semester 3 - Fall CCML240 Clinical Chemistry II HEML240 Hematology I MIML240 Clinical Microbiology & Infectious Diseases I TSML230 Transfusion Science RMIP230 Interprofessional Research</p> <p>Semester 4 - Winter CCML250 Clinical Chemistry III HEML250 Hematology II HIML251 Histotechnology & Special Staining MIML250 Clinical Microbiology & Infectious Diseases II PCIP240 Collaborative Patient Centred Care TSML242 Transfusion Practices</p> <p>Semester 5 - Summer CLML251 Clinical Education I LSIP250 Leadership in Health Care</p> <p>Semesters 6/7 F/W CLML361 Clinical Education II</p> <p>Note: The above curriculum is based on last year and is subject to change. Clinical education may be scheduled as simulation experience at Michener or as placement in clinical environments with our clinical partners.</p>
Course Descriptions	Not available on the webpage.
Contact	Don Bartlett, Clinical Education Officer Tel: 416.596.3126 dbartlett@michener.ca
Current Challenges	

6.3.7 St. Clair College – Medical Laboratory Science

College	St. Clair College Windsor Campus, 2000 Talbot Road West, Windsor, ON N9A 6S4 Phone: (519) 966-1656, Fax: (519) 972-3811
Program Name	Medical Laboratory Science
Credential	Advanced Diploma
Duration	3 years
Start	September
Fees	Tuition - \$1,920 Year 1, \$1,892.80 2 nd and 3 rd Year Additional fees: Alumni Fee - \$33.13 Windsor SAA Fee - \$115.93 Windsor SRC Fee - \$115.93 Student Centre - \$50.00 Graduation Fee - \$5.00/sem. Locker Fee - \$20.00 Health Insurance (Domestic) - \$61.89 Student Care Fee - \$7.00 Student Services Fee - \$6.00 Technology Access Fee - \$70.00 Transcript/Certification - \$8.00 Books, supplies, and equipment - approximately \$1,000 per year. Students may be placed in out-of-town sites for clinical internship and will be responsible for their accommodations.
Accreditation	Conjoint Committee on Accreditation, Canadian Medical Association
Licensing of Graduates	National examination set by the Canadian Society of Medical Laboratory Sciences
Partners	Not listed.
Entrance Requirements	<p>ADMISSION REQUIREMENTS</p> <p>Applicants who started High School in Ontario in September 1999 or later (OSS):</p> <p>OSSD with the majority of courses at the College (C), University (U), University/College (M), or Open (O) level plus the following with 60% or better:</p> <ul style="list-style-type: none"> • Grade 12 Math (C) or (U) with 60% or better • Grade 12 English (C) or (U) with 60% or better • Senior Level Physics (C) or (U) with a passing grade • Senior Level Chemistry (C) or (U) with 60% or better • Senior Level Biology (C) or (U) with 60% or better <p>Applicants who started High School in Ontario prior to Sept. 1999 (OSIS):</p> <p>OSSD with the majority of the credits at the general or advanced level or mature student status * or equivalent plus the following program specific requirements with 60% or better:</p> <ul style="list-style-type: none"> • Grade 12 Math with 60% or better (advanced), or 70% or better (general) • Grade 12 English with 60% or better (advanced), or 70% or better (general) • Senior Level Physics with 60% or better (advanced), or 70% or better (general) • Senior Level Chemistry with 60% or better (advanced), or 70% or better (general)

	<p>(general)</p> <ul style="list-style-type: none"> • Senior Level Biology with 60% or better (advanced), or 70% or better (general) <p>*mature student status (19 years of age or older prior to registration and do not have an OSSD or equivalent) – you will be required to write an Admissions Test.</p> <p>SELECTION PROCESS Note: This program is oversubscribed, therefore possibilities for acceptance will improve if you have subjects (English, Math, Chemistry, Biology and Physics) at higher percentages than the stated specific academic requirements.</p> <p>HEALTH REQUIREMENTS Accepted applicants must submit proof of a satisfactory medical examination and immunization including Hepatitis B.</p> <p>CLINICAL PLACEMENTS Employers who provide our clinical placement settings require a police record check for criminal offences before accepting a student into the clinical setting. The record check shall be obtained at the student’s expense. Appropriate forms will be provided by the College after acceptance into the program. The College assumes no obligation for ensuring clinical placement or program completion for students who are unable to provide a clear police record check.</p>
<p>Admissions Policy</p>	<p>Policy 1.2.1 – Admissions (2006): “Admission requirements for programs are established when the programs are created and must be signed off by the Registrar.” Admission requirements must follow ministerial guidelines and are reviewed “in conjunction with each program’s comprehensive program review.” Requirements “must reflect the academic requirements necessary for an initially successful academic experience.”</p> <p>Academic Standing Policy: A student will receive academic good standing at the end of a semester when the student has successfully completed all courses and maintained a Career Grade Point Average (GPA) of 2.00 or greater.</p> <p>St. Clair College’s admissions guidelines include: <u>Admission & Selection Procedures for Oversubscribed Programs</u>, which current encompasses Medical Laboratory Technology. <i>Normally all applicants who meet the academic qualifications for the program of their choice are offered admission to that program. However, in the case of heavily oversubscribed programs, particularly in Health Sciences, where the number of applicants who meet the academic requirements exceeds the number of places available, additional criteria for selection will be implemented.</i></p>
<p>Program Renewal Policy</p>	<p>All colleges in Ontario must submit programs to the Credential Validation Service (CVS) of Colleges Ontario (formerly Association of Colleges of Applied Arts and Technology of Ontario). The CVS assesses each submission to ensure it follows ministerial guidelines for college level courses. Specifically, CVS looks for learning outcomes at a level suitable for the credential sought, generic skills (i.e. employability skills), and general education courses specific to each program, but broad enough to ensure graduates have liberal education skills/knowledge.</p>

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Curriculum Model	Instructor lead, classroom and lab plus clinical experience. Learning outcomes and generic skills (i.e. employability skills).																																																															
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	<p>acid rain, ozone depletion and global warming. The sources and effects of atmospheric, hydrospheric and lithospheric pollution are discussed along with possible solution(s) to the problem. Current technologies for water purification, sewage and solid waste reduction are presented.</p> <p>CHM223A Organic Chemistry I 3 This is an introductory course covering; the IUPAC naming, the structure and formula, the basic chemical and physical properties and general chemical reactions of the organic compounds/groups presented. The organic families to be discussed are; the alkanes/cycloalkanes, the alkenes, the alkynes, benzene and its homologues and the major functional substituent groups of the aforementioned (i.e. alcohols/phenols, ethers, esters, aldehydes, ketones, carboxylic acids, amines, amides and amino acids). The major carbohydrates and lipids will also be discussed.</p> <p>MIC211 Computer II 3 This course is a continuation of MIC 111. Students will be introduced to spreadsheet (MS Excel) & database (MS Access) software, and the integration of data developed by the software in both courses. Problem solving in a business environment will be emphasized</p> <p>MDL110 Med Lab Orientation Skills 3 An orientation to the role and ethical responsibilities of the Medical Laboratory Technologist, to accepted procedures for the safe handling of specimens, reagents and equipment, and to the theoretical principles and applications of various types of microscopy. Proper use and care of the light microscope and other selected manual skills will be practised with an emphasis on safety and organization.</p> <p>MDL206 Analytical Techniques 3 Students will apply basic principles of math, chemistry and physics to understand the properties of solutions; chemical equilibrium and reaction rates; acids, bases & ionic equilibrium; oxidation and reduction and electrochemistry in a laboratory setting.</p> <p>MTH406 Probability & Statistics 2 This course introduces students of Chemical Laboratory Technology and Medical Laboratory Technician to some of the basic subject areas of statistics and statistical process control. General topics include collection of data, graphs, frequency distribution, summation notation, measures of central tendency and dispersion, normal distribution, sampling, confidence intervals, regression / correlation analysis and statistical process control.</p> <p>Semester 3</p> <p>MDL303 Instrumental Techniques 3 Medical laboratory technology students will study basic principles of selected instrumentation used in the clinical laboratory as follows</p> <p>MDL306 Human A & P Lab 1 A study of the microanatomy of human tissues and organs and of selected techniques used in assessing physiology (e.g. blood pressure, electrocardiogram, pulmonary function, urinalysis).</p> <p>MDL307 Intro to Clinical Laboratory 2 Medical laboratory technology students will study collection and handling of clinical samples and quality control data, method evaluation, and other aspects of quality assurance. Students will practice selected manual skills including phlebotomy and urinalysis. Emphasis in laboratory sessions is on safety, organization, following procedures, and proper reporting.</p> <p>MDL316 Clinical Immunology 2 This course provides the student with an introduction to how the body resists infection and disease, and the mechanisms used by the body in this</p>
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	<p>defense. The laboratory sessions will introduce the student to basic immunological tests, the principles of antigen/antibody reactions, and the diagnostic of significance of the test results.</p> <p>MDL317 Introductory Microbiology 2</p> <p>Students will be introduced to the microorganisms found in the environment, especially the characteristics and anatomy of the bacterial cell and its host/parasite relationships. To be included are the factors involved in virulence and infectious processes, sterilization and disinfection theory and principles, and the maintenance of equipment used for sterilization.</p> <p>Semester 4</p> <p>LBS110G Communication Across Cultures 3</p> <p>This course applies the theories of effective communication in intercultural contexts. Students will study the importance of social qualifiers (eg. gender, race, and class) and social agencies (eg. government, school, and workplace) to better understand both intercultural and intracultural elements in the communication process. By the end of the course, students will have improved their ability to communicate effectively across cultures. The course provides students with opportunities to make interactive group presentations.</p> <p>MDL426A Clinical Microbiology A 5</p> <p>This course is a continuation of MDL 317 and will stress the conventional techniques and procedures used in the clinical laboratory. Topics will include the theory and principles of media use, antimicrobial susceptibility testing and some semi-automated systems as applied to Clinical Microbiology. Discussions will include sample collection, processing, incubation, evaluation and reporting of relevant clinical pathogens and non-pathogens isolated from biological samples. Practical and theoretical discussions will include procedures used in the isolation and identification of facultative anaerobic Gram positive cocci, Enterobacteriaceae, non-fermentative Gram-negative bacilli and some fastidious Gram negative bacilli.</p> <p>MDL427A Clinical Chemistry A 5</p> <p>A study of the physiology, analysis, and diagnostic significance of carbohydrates, lipids, proteins, and enzymes in human biological fluids, and the evaluation of cardiovascular and liver function. Students practice basic techniques and quantitative methods related to clinical chemistry.</p> <p>MDL428A Hematology A 5</p> <p>This course provides an introduction to and study of basic characteristics and components of blood and blood forming organs of the body. Students will then undertake a theoretical and practical study of red blood cell disorders.</p> <p>MDL429A Transfusion Science A 5</p> <p>This course reviews the history of transfusion and the fundamental principles of antigen/antibody reactions in relation to human blood group systems. Students will also cover the storage, processing and compatibility testing of donated blood and the role of the Canadian Blood Service.</p> <p>MDL435A Histotechnology & Histology A 4</p> <p>Students will learn the principles and practice the skills used for the fixation, processing and sectioning of histological samples in the clinical laboratory. Basic dye chemistry and staining mechanisms will be introduced, and microanatomy will be reviewed over all sections of the course.</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Course Name</th> <th>Credit</th> </tr> </thead> <tbody> <tr> <td colspan="3">Semester 5</td> </tr> <tr> <td>NRS160G</td> <td>Ethics & Professionalism</td> <td>3</td> </tr> </tbody> </table>	Code	Course Name	Credit	Semester 5			NRS160G	Ethics & Professionalism	3
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	<p>This General Education course focuses upon ethical issues and dilemmas faced by individuals as citizens and as professionals. It helps students to clarify their values and establish a framework for ethical decision-making. Ethical issues of a general nature are examined which relate to a wide variety of concerns, such as those faced by citizens in the exploration of life issues ranging from environmental to human right concerns. A component of the course allows students to investigate the ethical codes of their chosen profession and apply ethical analysis models to dilemmas which typify those often encountered in the practice of their profession or vocation.</p> <p>MDL420 Mycology & Parasitology 2 An introduction to the study of pathogenic fungi, nematodes, protozoa, round and flat worms.</p> <p>MDL426B Clinical Microbiology B 5 This course is a continuation of Clinical Microbiology A and will include conventional techniques and procedures used in a clinical microbiology laboratory. Topics will include the theory and principles of sample collection, processing, incubation, evaluation and reporting of relevant clinical pathogens and non-pathogens isolated from a variety of patient samples. Discussion will include isolation and identification procedures for aerobic Gram negative cocci, some fastidious Gram negative bacilli, anaerobic organisms, spore forming and non-spore forming Gram positive bacilli, Mycobacterium species, Mycoplasma sp., Rickettsia sp., Legionella sp., spirochetes, and some clinically significant viruses, parasites and fungal pathogens commonly recovered from clinical specimens. Automated systems will also be discussed.</p> <p>MDL427B Clinical Chemistry B 4 A study of the physiology, analysis, and diagnostic significance of non-protein nitrogenous compounds, electrolytes and gases in biological fluids, and the evaluation of gastrointestinal, liver, cardiovascular, and kidney function. Various types of ligand assays, toxicology, therapeutic drug monitoring, and diagnostic tests on body fluids other than blood will also be covered. Students will visit a clinical laboratory to observe the operation and maintenance of more sophisticated instrumentation, and will participate in case studies and core lab exercises.</p> <p>MDL428B Hematology B 4 Students will undertake a theoretical and practical study of white blood cell and platelet disorders, and the basic concepts of hemostasis, related tests, and disorders. Students will also review all clinical conditions studied in the previous semester.</p> <p>MDL429B Transfusion Science B 5 This course introduces the student to the techniques used to investigate and resolve unusual serological conditions related to the transfusion of blood and blood components.</p> <p>MDL435B Histotechnology & Histology B 4 Students will learn the principles and practice techniques for the staining of routine tissue sections, connective tissue elements, microorganisms, pigments, minerals, carbohydrates and lipids. Theory and practice of methods involved in cryostat sectioning, cytological specimen handling, and immunohistochemistry are also covered and the review of microanatomy continues from MDL 435A.</p> <p>Semester 6</p> <p>MDL505 Clinical Chemistry Internship 20 An eight week applied learning experience in clinical chemistry undertaken at a clinical site associated with St. Clair College. This includes one week of</p>
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	<p>urinalysis.</p> <p>MDL519 Clinical Microbiology Intern 20 An eight week applied learning experience in clinical microbiology undertaken at a clinical site associated with St. Clair College. (This may also include one week at the Ontario Public Health Laboratory).</p> <p>MDL522 Hematology Internship 15 A six week applied learning experience in clinical hematology undertaken at a clinical site associated with St. Clair College.</p> <p>MDL523 Histotechnology Internship 10 A four week applied learning experience in clinical histotechnology undertaken at a clinical site associated with St. Clair College.</p> <p>MDL524 Clinical Work Experience 8 A three week applied work experience in any of the clinical laboratory areas which may include review, further practice, and/or shift work at the discretion of the clinical site associated with St. Clair College.</p> <p>MDL525 Transfusion Science Intern. 15 A six week applied learning experience in clinical transfusion science undertaken at a clinical site associated with St. Clair College.</p> <p>MDL706G Change In The Workplace 3</p> <p>Students will examine the concepts of change in the workplace. Historical aspects of the Canadian Health Care System and recent changes to the system will be explored. The significance of these changes to the citizens of Canada and Ontario, and to the roles of workers in the field will be considered. Areas to be addressed include</p> <p>Semester 7</p> <p>MDL920 Haematology Review 1 A consolidation of theoretical and applied knowledge in clinical hematology.</p> <p>MDL921 Transfusion Science Review 1 A consolidation of theoretical and applied knowledge in clinical transfusion science.</p> <p>MDL922 Histotechnology Review 1 A consolidation of theoretical and applied knowledge in clinical histotechnology.</p> <p>MDL923 Clinical Microbiology Review 1 A consolidation of theoretical and applied knowledge in clinical microbiology.</p> <p>MDL924 Clinical Chemistry Review 1</p>
Contact	Stephanie Nagle, Chair - School of Health Sciences Tel: (519) 972-2727 ext. 4456 Fax: (519) 972-2786 snagle@stclaircollege.ca
Current Challenges	

6.3.8 St. Lawrence College– Medical Laboratory Science

College	St. Lawrence College Kingston Campus 100 Portsmouth Avenue, Kingston, Ontario K7L 5A6 www.sl.on.ca
Program Name	Medical Laboratory Science
Credential	Advanced Diploma
Duration	3 years, 6 semesters
Start	September
Fees	Approximately \$2,713 per year.
Accreditation	Conjoint Committee on Accreditation, Canadian Medical Association
Licensing of Graduates	National examination set by the Canadian Society of Medical Laboratory Sciences
Partners	
Entrance Requirements	<p>Ontario Secondary School Diploma (or equivalent), with the following prerequisites:</p> <ul style="list-style-type: none"> • Grade 12 Math at the C or U level • Grade 12 English at the C or U level • Grade 11 or 12 Chemistry at the C or U level • Grade 11 or 12 Biology OR Physics at the C or U level <p><u>Additional Requirements:</u></p> <ul style="list-style-type: none"> • Current Standard First Aid and CPR Basic Rescuer Level C (certification must remain current for the duration of the program). • Students may be requested to obtain, at their own expense, a Police Records Check (CPIC) prior to work placement. • Basic computer literacy skills. <p><u>Recommended Background:</u> Students must have effective written and verbal English communication skills in order to demonstrate competency with clients and coworkers. Successful students have an aptitude for biological sciences, strong organizational skills and pay attention to detail.</p> <p><u>Health Requirements:</u> The health of each applicant accepted into the program must be such that you can: a) cope successfully with the program of instruction including the field placement experience; b) meet the health requirements of field placement settings. Evidence of these requirements is to be met by submitting proof of health requirements as requested by the campus Health Centre.</p> <p>In addition to regular immunization, it is MANDATORY that each student be immunized against Hepatitis B & Typhoid. The cost is approximately \$150.00. To meet these requirements, please contact your local physician.</p>
Admissions Policy	<p><u>Academic Policy Manual: Admissions –</u> The admissions policy was established to conform with the intentions and directions of the Ministry of Training, Colleges and Universities set out in the College Admissions Policy of the Ministry (2000).</p>

	<p><u>General Admission Policy</u> stipulates: a) the acceptance of all who are qualified within established program limits; b) the use of the ranking procedure where the number of qualified applicants exceeds that limit; c) a clear statement to all unsuccessful applicants as to why they were not admitted.</p> <p><u>General Admission Requirement:</u> Ontario Secondary School Diploma or equivalent and at least 19 years of age.</p> <p><u>Additional Admission Criteria:</u> Beyond the general requirement, the College may identify additional entrance requirements for specific programs. These requirements shall be established by the Academic Council for each program at the time of program approval.</p> <p><u>Admission Priorities:</u> 1) Permanent Ontario residents; 2) Permanent residents from other Canadian provinces; 3) Applicants from other countries. All applicants are given equal consideration and accepted on a first qualified, first served basis. However, the policy allows for <i>“further differentiation among qualified candidates for a particular program ... based on the College’s assessment of each candidate’s relative probability of success in the program. The College believes that the most valid single predictor of future academic performance is a candidate’s past academic achievement.”</i> Ranking of applicants is used when there is a need to differentiate applicants when all qualified applicants cannot be accepted. Ranking is done by assigning a score to courses listed in the programs entrance requirements. International students must provide proof of English competence.</p>
<p>Program Renewal Policy</p>	<p>All colleges in Ontario must submit programs to the Credential Validation Service of Colleges Ontario (formerly Association of Colleges of Applied Arts and Technology of Ontario). The CVS assesses each submission to ensure it follows ministerial guidelines for college level courses. Specifically, CVS looks for learning outcomes at a level suitable for the credential sought, generic skills (i.e. employability skills), and general education courses specific to each program, but broad enough to ensure graduates have liberal education skills/knowledge.</p> <p>St Lawrence’s curriculum policy includes sections on general education, generic skills, standard course outlines, program/course cancellation, and program name change. Generic skills outlined in this policy include analytical skills (critical thinking and problem solving).</p>
<p>Curriculum Model</p>	<p>Instructor lead, theory and lab with clinical experience. Curriculum is developed in learning outcomes and includes generic skills (i.e. employability skills) and general education courses. All courses are developed using a standard course outline format as per academic policy.</p>
<p>Courses and Course Descriptions</p>	<p>Medical Laboratory Science Program Outline <u>NOTE:</u> Students are required to take three general education courses in a 3-year program. Over the third year, students go through clinical rotations at a hospital site. Hospital rotations vary in length from 8 to 10 weeks. <u>NOTE:</u> All prescribed courses in Semesters 3 & 4 must be completed in the academic year immediately prior to entering third year. <i>Continuance in the program requires a minimum grade of 63% (C grade) in all courses.</i></p> <p>Semester 1 (15 weeks) BIOL 150 Cell Biology</p>

	<p>An introductory course to Biotechnology / Medical Laboratory Science/Veterinary Technology students, covering the biological and chemical principles of the cell with reference to energy flow, structure and function, anatomy, reproduction, genetics and cell diversity. Prerequisite: None</p> <p>BIOL 151 Biolab (30 hours) This course introduces Health Science students to the principles of bright field microscopy. The focus of this course is the application of microscopy skills through the introduction of a wide variety of cells and tissue types. PRE-REQUISITE: None.</p> <p>BSCI 150 General Chemistry (45 hours) This course will emphasize many of the mathematical calculations that are used in basic inorganic chemistry. Topics covered include atomic structure, chemical bonding, nomenclature, stoichiometric problems involving chemical formulae and equations, chemical kinetics and equilibria, solution concentrations, dilutions, and titrations, acids, bases, pH and buffers, and the gas laws. PRE-REQUISITE: None</p> <p>CHEM 151 Chemlab (60 hours) Use and maintenance of common chem lab materials, tools and equipment; WHMIS and lab safety rules; preparation of solutions and calibration curves. The successful student will have the knowledge and the skills to operate basic laboratory equipment and the ability to proceed to more complex laboratory procedures. PRE-REQUISITE: None</p> <p>COMM 150 Communications - written (45 hours) This course is designed to equip medical, biotechnical and veterinary technology students with the writing and reading skills needed in both academic and professional settings. After reviewing the fundamentals of grammar, students will be taught report and technical essay writing skills. Library research skills will be taught with emphasis on bibliographies, citations, and avoiding plagiarism. In addition, the scientific method of communication will be examined in the context of the academic lab report. Various other professional and technical writing formats will also be examined, including letters and memoranda. Throughout the course, a study of scientific and medical vocabulary will be conducted to facilitate reading scientific/medical information. PRE-REQUISITE: None</p> <p>COMH 150 Computer Literacy (30 hours) This course is designed for Health Sciences students as an introductory course. It will help the student to become "computer literate". The components of this course are: Microsoft Office - Word 2003, Excel 2003, Access 2003 and Microsoft Internet Explorer. This is primarily a lab course. Pre-requisite: None.</p> <p>MATH 150 Mathematics (45 hours) This course is designed to provide the necessary scientific mathematical skills for students in the first semester of the Biotechnology, Medical Laboratory Science, Veterinary Technology and Health Information Management programs. Biological and laboratory applications are emphasized with topics including: use of a scientific calculator, conversion of units, calculation of drug dosages and nutritional requirements, dimensional analysis, absorption calculations, dilution calculations, graphing of data, linear regression techniques, and use of logarithms in laboratory calculations and formula. Statistical calculations are applied to quality control. PRE-REQUISITE: None</p> <p>PHYS 180 Physics for Biology (no course description provided)</p> <p>SOC1 100 Survivor (Gen. Ed.)* (16 hours) Social, cultural, personal understanding at its best.</p>
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	<p>Semester 2 (15 weeks)</p> <p>BIOL152 Mammalian Anatomy & Physiology A study of anatomical features and physiological functions, showing relationships between them, for the following systems: endocrine, muscular, skeletal, nervous, circulatory, digestive, urogenital, respiratory, lymphatic and integumentary; also, a consideration of basic homeostatic mechanisms. Prerequisites: BIOL 150, BIOL 151. BIOL 153L Introduction to Microbiology – Lab BIOL 153T Introduction to Microbiology – Theory BIOL 230 Basic Immunology</p> <p>CHEM 153 Bio/Organic Chemistry (45 hours) This course introduces the student to the nomenclature and properties of the major organic functional groups. It also covers the structure and properties of carbohydrates, lipids, proteins and nucleic acids and the major metabolic pathways connecting these macromolecules. The properties of enzymes that catalyze these biological reactions are discussed in depth. PRE-REQUISITES: BSCI 150, CHEM 151, COMH 150.</p> <p>ETHS 150 Bioethics (Gen. Ed.)* (45 hours) This course provides students an opportunity to examine various bioethical issues faced by individuals in the Health and Science professions and everyday life. After considering the values, beliefs, assumptions, and principles that affect ethical decision-making, students will explore various issues related to topics such as genetic engineering, research that uses animals, euthanasia, and patient confidentiality. The course offers a mixture of class discussions, oral presentations, and written assignments. PRE-REQUISITE: None</p> <p>LABS 205 Diagnostic Specimen Preparation</p> <p>MATH 151 Biostatistics (45 hours) This course introduces some of the statistical skills necessary for scientific research. Topics include: measures of central tendency and dispersion; data analysis; probability; probability distributions; quality control; confidence interval; interval estimation; Z, t, and F hypothesis tests; correlation and regression. PRE-REQUISITES: MATH 150, CHEM 151, COMH 150.</p> <p>Semester 3 (15 weeks)</p> <p>CHEM 201 Clinical Chemistry I (90 hours) A study of the clinical chemistry of blood, urine, and other body fluids is applied to carbohydrates, lipids, proteins, amino acids, nucleic acids and enzymes. The use and interpretation of clinical procedures are discussed with emphasis on the critical appraisal of laboratory methods as applied to the study of disease. PRE-REQUISITES: LABS 205, BIOL 152, MATH 151, ETHS 150, CHEM 153, BIOL 230.</p> <p>HEMA 200 Haematology I (75 hours) Students will be introduced to a variety of hematology topics including production and destruction of hematopoietic cells; structure and functions of various cells; cell morphology; investigative procedures and typical laboratory findings of blood diseases. Theory and practical principles of hemostasis and coagulation will be discussed. PRE-REQUISITES: BIOL 152, BIOL 230, CHEM 153, ETHS 150, LABS 205.</p> <p>HSTO 204 Histotechnology (45 hours) This course introduces histotechnology, and includes the principles, theory and application of procedures and equipment related to tissue fixation, decalcification, processing, embedding and cutting. It will also explain the theory behind, and the techniques involved, in routine and special stains used to demonstrate tissue morphology. PRE-REQUISITES: LABS 205,</p>
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	<p>BIOL 152, MATH 151, ETHS 150.</p> <p>MICR 203 Clinical Microbiology I (90 hours) This course begins a systematic study of medically important bacteria found in clinical specimens and common methods used to detect and identify them. The role of the clinical microbiology laboratory in health care delivery and quality management practices relevant to this service are also studied. PRE-REQUISITES: BIOL 152, BIOL 153, ETHS 150, COMM 150.</p> <p>TRAN 202 Transfusion Science (45 hours) Included in this course will be a study of genetics and immunology as related to blood group immunology, blood groups, haemolytic disease, transfusion practices and problems, blood components and donor requirements. Also included will be the methods, practical experiences and equipment needed to gain a full understanding of a transfusion laboratory. PRE-REQUISITES: BIOL 152, BIOL 153, BIOL 230, LABS 205, ETHS 150.</p> <p>Semester 4 (15 weeks)</p> <p>CHEM 207 Clinical Chemistry II (75 hours) A study of enzymes, the procedures used to measure organ function and systems of metabolic importance including liver and kidney. Students study acid-base balance and electrolytes and are introduced to ligand assay and therapeutic drug monitoring. PRE-REQUISITES: CHEM 201.</p> <p>HEMA 206 Haematology II (75 hours) A study of the morphology, investigative procedures and typical laboratory results of the important blood diseases. Abnormal blood and bone marrow findings plus other diagnostic procedures will be studied in the laboratory. The theory of haemostasis, haemostatic disorders and laboratory techniques used in the diagnosis of bleeding disorders will be studied. PRE-REQUISITE: HEMA 200. HLTH 1100 Health Care in Canada – Gen. Ed. HSTO 210 Histotechnology II</p> <p>MICR 208 Clinical Microbiology II (75 hours) This course continues the clinical bacteriology of MICR 203 and allows the student to practice common antimicrobial susceptibility testing methods. Mycobacteriae, common yeasts of medical importance, HIV and agents of hepatitis will be introduced with an emphasis on detection methods. PRE-REQUISITE: MICR 203.</p> <p>TRAN 202 Transfusion Science (cont'd) (45 hours) Included in this course will be a study of genetics and immunology as related to blood group immunology, blood groups, haemolytic disease, transfusion practices and problems, blood components and donor requirements. Also included will be the methods, practical experiences and equipment needed to gain a full understanding of a transfusion laboratory. PRE-REQUISITES: BIOL 152, BIOL 153, BIOL 230, LABS 205, ETHS 150.</p> <p>Semester 5 & 6 (45 weeks)</p> <p>CHEM 80T Clinical Chemistry – Theory (Theory and lab – 324 hours) The Clinical Chemistry internship is a composite of manual and automated procedures and exposure to the professional atmosphere found in a hospital lab. Students under supervision are involved in the analysis of patient samples and the quality control programs associated with acceptable laboratory standards. PRE-REQUISITE: Semesters 3 and 4 completed in the year immediately previous to Year 3.</p> <p>CHEM 80L Clinical Chemistry – Laboratory</p> <p>HEMA 82T Clinical Haematology – Theory (Theory and lab – 324 hours) In the third year, the student has the opportunity to reinforce and apply the principles and technical skills learned in the second year. In the clinical</p>
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	<p>laboratories under supervision, the student will be involved in the analysis of patient samples, quality control programs and the general workings of Haematology laboratories. PRE-REQUISITE: Semesters 3 and 4 completed in the year immediately previous to Year 3.</p> <p>HEMA 82L Clinical Haematology – Laboratory</p> <p>HSTO 83T Clinical Histotechnology – Theory (Theory and lab – 324 hours) The purpose of the third year Histotechnology internship is to reinforce and apply theory and techniques that were introduced in the second year of the program. PRE-REQUISITE: Semesters 3 and 4 completed in the year immediately previous to Year 3.</p> <p>HSTO 83L Clinical Histotechnology – Laboratory</p> <p>MICR 81T Clinical Microbiology – Theory (Theory and lab – 324 hours) In the third year, the student has the opportunity to apply the theory and technical skills learned in the second year. In the clinical laboratories under supervision, the student will be involved in the processing and analysis of patient specimens, quality control programs and the general workings of the clinical microbiology laboratory. PRE-REQUISITE: Semesters 3 and 4 completed in the year immediately previous to Year 3.</p> <p>MICR 81L Clinical Microbiology – Laboratory</p> <p>TRAN 84T Clinical Transfusion Science – Theory (Theory and lab – 324 hours) During the third year, students will have the opportunity to correlate and practise the knowledge from second year, in a supervised clinical laboratory. In addition, they will be able to see unusual testing procedures that will enhance the overall theory of Transfusion Science. PRE-REQUISITE: Semesters 3 and 4 completed in the year immediately previous to Year 3.</p> <p>TRAN 84L Clinical Transfusion Science - Laboratory</p>
Contact	<p>Jan Fox, Program Coordinator (613) 544-5400, ext. 1206 Jfox@sl.on.ca</p>
Current Challenges	

6.3.9 New Brunswick Community College– Medical Laboratory Technology

College	New Brunswick Community College Saint John Campus P. O. Box 2270, 950 Grandview Ave., Saint John, NB E2L 3V1 www.nbcc.nb.ca
Program Name	Medical Laboratory Technology
Credential	Diploma
Duration	2.5 years
Start	September
Fees	Tuition - \$2,600 per year
Accreditation	Conjoint Committee on Accreditation, Canadian Medical Association
Licensing of Graduates	National examination set by the Canadian Society for Medical Laboratory Science (CSMLS)
Partners	Not listed on the webpage or in the calendar.
Entrance Requirements	<ul style="list-style-type: none"> • High School Diploma or Adult High School Diploma or GED Diploma of High School Equivalency. • Grade 11 Mathematics Parts A and B (Level 2) • Two (2) additional sciences (Chemistry or Physics)-Grade 11 or 12 (Level 2) <p><u>Specific Considerations:</u> An understanding of basic Chemistry is an asset. It is recommended that the additional sciences required for admission be Chemistry courses. University science credits may be considered in lieu of High School subjects.</p> <p>Students will be asked to submit proof of a satisfactory physical examination and immunization prior to commencement of training by following the instructions on the standardized New Brunswick Community College Medical form.</p> <p>Hepatitis B immunization is expected for those who are accepted. Applicants who have not been previously immunized against Hepatitis B can receive immunization arranged by NBCC (at their own cost) after admissions to the program. It should be noted that certain immunizations are required for anyone entering a training program involving a practicum that takes place in a hospital or related setting.</p> <p>Good health and a good level of physical fitness and stamina are essential. In addition, the nature of this occupation requires a sincere desire to work with and help other people, at times under trying circumstances. A mature outlook is essential. Individuals with <u>color blindness</u> should discuss this condition with their physician before pursuing a career in Medical Laboratory Technology.</p>
Admissions Policy	Policy 4105P – Recruitment and Admissions:

	<p><u>Guiding Principle (excerpt):</u></p> <ul style="list-style-type: none"> • With regards to admissions, the New Brunswick Community College has adopted the "First Qualified, First Accepted" concept. This policy reflects the College's (NBCC & CCNB) intention to promote access to postsecondary level technical and occupational training as per its mandate. The instructional and administrative requirements set out herein have as their goal the implementation of an effective, fair and transparent system, the application of which should not constitute an obstacle to admission. <p><u>Policy Statement (excerpt):</u></p> <ul style="list-style-type: none"> • The minimum requirement for admission to a program is the New Brunswick High School Diploma, or a diploma recognized by the New Brunswick Department of Education, or the equivalent. The following are recognized as equivalents: the General Education Diploma (GED); the General Studies Certificate, the Basic Training for Skills Development (BTSD) program, or the Pre-Technology program up until the 1992-93 school year; a minimum score of 900 on the SAT (Scholastic Aptitude Test) accompanied by external proof of successful completion of prerequisite courses. External proof may be in the form of a final mark awarded by a high school in the public education system or a provincial exam. • To facilitate the admission process, admission requirements are grouped into profiles (refer to NBCC Admission Profiles) depending on the nature and complexity of the program. In exceptional circumstances, some programs may have additional requirements approved by the Assistant Deputy-Minister beyond these admission profiles and these are set out in each program's description. • Specific considerations such as medical examinations, criminal record checks and employer related testing are no longer considered to be Community college admission requirements but rather as particular considerations of programs. They should be treated as such when, for example, writing abstracts. • Applicants who have successfully completed postsecondary studies in a related field will be considered as having met the minimum requirements for admission to a program. Where specific prerequisite courses are required, an exemption may be granted by the designated authority responsible for the program. <p><u>Language Requirements:</u> Full participation in learning activities depends upon adequate proficiency in the language of instruction. In some cases, proof of proficiency level may be required, in the form of language test results.</p> <p><u>Priority for Admission:</u></p> <ol style="list-style-type: none"> 1. Permanent residents of New Brunswick. 2. Residents of other Canadian provinces and territories. These applications are usually processed after March 1st except in the case of programs that are undersubscribed. 3. Applicants from other countries. A number of seats (2% of CCNB and 10% of NBCC available seats) are designated for international students whose applications are treated on a continuous basis.
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Policy 4303P – Course Pass Mark:

The common pass mark for every course is 60%. **Exceptions**

This policy does not apply to the apprenticeship programs (Apprenticeship and Certification Branch), including Academic Studies and Adult High

Program Renewal Policy	Not listed on the webpage.
Curriculum Model	Instructor lead theory and labs as well as clinical experience.
Courses	<p>Topics included in the program are:</p> <ul style="list-style-type: none"> • Ethics and Professionalism • Anatomy and Physiology • Clinical Chemistry • Haematology • Histotechnology • Transfusion Science • Clinical Microbiology • Small Hospital Laboratory Internship • Phlebotomy • Urinalysis • Regional Hospital Laboratory Internship • Safety including First Aid, WMHIS, Occupational Health and Safety
Course Descriptions	Specific courses and descriptions are not listed on the webpage.
Contact	<p>Peter McGill, Principal – NBCC Stain John Campus Tel: (506) 658-6600 FAX: (506) 658-6792 Toll free: 1-800-416-4080 Email: studentservices.nbccsj@gnb.ca</p> <p>Gerald Ingersoll, Chief Learning Officer Phone: (506) 529-5005 Fax: (506) 529-5039 Email Address: gerald.ingersoll@gnb.ca</p>
Current Challenges	

6.3.10 Saskatchewan Institute of Applied Science and Technology – Medical Laboratory Technology

College	Saskatchewan Institute of Applied Science and Technology (SIAST) SIAST Kelsey Campus Idylwyld and 33rd Street PO Box 1520, Saskatoon SK S7K 3R5 www.siastr.sk.ca
Program Name	Medical Laboratory Technology
Credential	Diploma
Duration	2 years (Year 1 - 41 weeks and Year 2 - 37 weeks)
Start	August
Fees	Tuition - (subject to change - other mandatory fees may apply and will be assessed at the campus) Year 1 - \$3880 and Year 2 - \$4462 Books and Supplies - (approximate) Year 1 - \$2180 and Year 2 - \$270
Accreditation	Conjoint Committee on Accreditation, Canadian Medical Association
Licensing of Graduates	National examination set by the Canadian Society of Medical Laboratory Sciences
Partners	SIAST lists the following as educational partners: <ul style="list-style-type: none"> • Dumont Technical Institute • First Nations University of Canada • Saskatchewan Apprenticeship and Trade Certification Commission • Saskatchewan Indian Institute of Technologies • Saskatchewan Regional Colleges • University of Regina • University of Saskatchewan <p>However, no health-related partners were listed specific to the Medical Laboratory Technology program.</p>
Entrance Requirements	<p><u>Admission Method - High-Demand Program</u> High-demand programs consistently have more applicants than spaces available and are offered at only one SIAST location. High-demand programs have admission requirements plus additional selection criteria.</p> <p><u>Admission Requirements:</u></p> <ul style="list-style-type: none"> • Grade 12 with English Language Arts A30, English Language Arts B30, Math B30 and two sciences from Physics 20*, Chemistry 30 or Biology 30 • Minimum of 70% in Math B30 and each science <p>Note: *Physics 30 will not be substituted for Physics 20.</p> <p>Standard First Aid and CPR Level 'C' certification are required prior to entry into the clinical practicum.</p> <p><u>English Language Requirement</u> English is the language of instruction and examination at SIAST. If your first or primary language is not English, you will need to provide evidence of having the English language skills in speaking, listening, reading and writing needed to be successful in the SIAST program you are applying to.</p> <p>For SIAST credit programs (except the Nursing Education Program of Saskatchewan): Evidence can be demonstrated in one of the following ways:</p>

	<ul style="list-style-type: none"> • Successful completion of the English course(s) (or equivalent) required for admission to the program plus a minimum of three years of successful, formal, full-time secondary or post secondary level of student conducted in English in Canada, the United States of America, England, Scotland, Ireland, Australia, New Zealand or South Africa. • Achievement of the program minimum admission scores on the Canadian Language Benchmarks Assessment (CLBA). The CLBA measures English proficiency in listening, speaking, reading and writing. CLBA assessment is available at SIAST. • An overall score of 81 or higher on the Internet-based Test of English as a Foreign Language (TOEFL iBT), with a minimum score of at least 19 in each of reading, listening, speaking and writing. • An overall score of at least Band 6.5 on the Academic International English Language Testing System (IELTS), with no module score less than 5.0. <p><u>Selection Criteria:</u></p> <ul style="list-style-type: none"> • Phase I - Average will be calculated on high school subjects required for admission (see Admission Requirements above) • Phase II - Additional selection criteria will be applied to those with the highest averages in Phase I <ul style="list-style-type: none"> ○ Admission Average = 30% ○ Career Investigation = 30% ○ Interview = 40%
Admissions Policy	<p>Policy G-3.2 – Admissions (2007): “Admission criteria for programs are established that consider academic rigour, curriculum content, industry standards and other factors directly related to students’ success in the program. ... SIAST admits students to the majority of its programs on a first-qualified, first-admitted basis.” Although it does not state it directly, it appears the entrance requirements and any special selection processes are set by the program. The policy allows for programs to be designated as high demand which allows for applicants to be “considered on the basis of approved admission requirements plus additional selection criteria.” Admission priority is given to “Canadian residents and landed immigrants. Admission to high demand programs may be restricted to residents of Saskatchewan.”</p> <p>Policy A-1.15 – SIAST Program/Course Completion Credentials (2006): “All credit programs have a formal assessment of training. The pass mark is 60%.”</p>
Program Renewal Policy	<p>Policy G-3.4 – Program Review (2000): Having established a strong track record of comprehensive program reviews based on a 5-year review cycle, SIAST moved to a more targeted evaluation process with this policy. The policy established 2 phases for program review, one related to the accreditation review cycle for the program and a second which takes the form of an annual self-assessment. The self-assessment is to determine a program’s “achievement of the key factors and performance indicators of a quality program”. The policy applies to all core-funded programs. The policy requires all programs to seek “the highest level of accreditation of program approval available”.</p> <p>Completing accreditation reviews is the responsibility of program staff. As part of the process, the policy allows programs to undertake optional research to provide additional information relevant to program review and renewal, but not required for accreditation approval. The policy contains lists of items that should be considered for both the accreditation review and the annual self-assessment.</p> <p>The annual self-assessment has 2 components: 1) an annual statistical report; and 2) an annual program reflection. The outcome of the self-assessment is “action plan development that supports program growth and renewal”. “For</p>

	<p>SIAST credential programs, the Planning, Research and Development Division will prepare an annual report on the key factors and performance indicators that have readily available quantifiable data. This report will contain an assessment of the program's results based on the benchmark for each program indicator." The completed statistical report is reviewed by the program head as part of the self-assessment and self-reflection processes.</p>																																																		
Curriculum Model	<p><u>Clinical Experience</u>: Clinical experience takes place in a clinical setting in the field of study in which students are orientated, taught, monitored and evaluated by SIAST instructors or preceptors based on established learning outcomes. 15 hours of clinical experience = one credit unit.</p> <p><u>Classroom</u>: Your instruction will occur in a classroom setting that is usually complemented by labs and clinical experiences,</p> <ul style="list-style-type: none"> • Year 1 - The program consists of 35 weeks of theory at Kelsey Campus (August - May), one week of clinical experience in Saskatoon (February) and five weeks of clinical experience as assigned by COPP (May - June). • Year 2 - The program consists of five weeks of theory at Kelsey Campus (August - September) and 34 weeks of clinical experience as assigned by COPP (September - May). • Some courses are also offered via <u>distance learning</u>. 																																																		
Courses	<p>Year 1</p> <table border="0"> <tr><td>APHY 188</td><td>Anatomy and Physiology</td></tr> <tr><td>CHEM 198</td><td>Clinical Chemistry 1</td></tr> <tr><td>CHEM 199</td><td>Clinical Chemistry 2</td></tr> <tr><td>CLIN 196</td><td>Clinical Introduction 1</td></tr> <tr><td>CLIN 197</td><td>Clinical Introduction 2</td></tr> <tr><td>COMM 380</td><td>Communication in Health Care</td></tr> <tr><td>COMP 170</td><td>Basic Computer Operation</td></tr> <tr><td>COMP 172</td><td>Introduction to Microsoft Word and Excel</td></tr> <tr><td>HEMA 187</td><td>Hematology 2</td></tr> <tr><td>HEMA 188</td><td>Hemopathology Erythrocytes</td></tr> <tr><td>HEMA 190</td><td>Hematology 1</td></tr> <tr><td>HSTC 184</td><td>Microanatomy</td></tr> <tr><td>HSTC 185</td><td>Histotechnology 1</td></tr> <tr><td>HSTC 187</td><td>Histotechnology 2</td></tr> <tr><td>HUMR 182</td><td>Human and Workplace Relations</td></tr> <tr><td>IMMU 183</td><td>Immunology</td></tr> <tr><td>INFC 180</td><td>Infection Control and Safety</td></tr> <tr><td>MGMT 188</td><td>Management Practices</td></tr> <tr><td>MICR 187</td><td>Microbiology 1</td></tr> <tr><td>MICR 188</td><td>Microbiology 2</td></tr> <tr><td>MTER 180</td><td>Medical Terminology</td></tr> <tr><td>PATH 181</td><td>Laboratory Result Correlation</td></tr> <tr><td>PROC 180</td><td>General Laboratory Practice</td></tr> <tr><td>PROC 181</td><td>Specimen Collection and Handling</td></tr> <tr><td>QC 194</td><td>Quality Management</td></tr> </table>	APHY 188	Anatomy and Physiology	CHEM 198	Clinical Chemistry 1	CHEM 199	Clinical Chemistry 2	CLIN 196	Clinical Introduction 1	CLIN 197	Clinical Introduction 2	COMM 380	Communication in Health Care	COMP 170	Basic Computer Operation	COMP 172	Introduction to Microsoft Word and Excel	HEMA 187	Hematology 2	HEMA 188	Hemopathology Erythrocytes	HEMA 190	Hematology 1	HSTC 184	Microanatomy	HSTC 185	Histotechnology 1	HSTC 187	Histotechnology 2	HUMR 182	Human and Workplace Relations	IMMU 183	Immunology	INFC 180	Infection Control and Safety	MGMT 188	Management Practices	MICR 187	Microbiology 1	MICR 188	Microbiology 2	MTER 180	Medical Terminology	PATH 181	Laboratory Result Correlation	PROC 180	General Laboratory Practice	PROC 181	Specimen Collection and Handling	QC 194	Quality Management
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	<p>TRFS 180 Transfusion Science 1</p> <p>TRFS 181 Transfusion Science 2</p> <p>Year 2</p> <p>CHEM 285 Clinical Chemistry 3</p> <p>CHEM 286 Clinical Chemistry 4</p> <p>CLIN 284 Clinical Hematology</p> <p>CLIN 285 Clinical Transfusion Science</p> <p>CLIN 286 Clinical Microbiology</p> <p>CLIN 287 Clinical Histotechnology</p> <p>HEMA 189 Hemopathology Leukocytes</p> <p>MICR 189 Microbiology 3</p> <p>TRFS 182 Transfusion Science 3</p>
<p>Course Descriptions</p>	<p>APHY 188 - Anatomy and Physiology Credit Units: 5.00 You will develop an understanding of the structure and function of organs and systems in the normal human body. You will continue to study medical terminology and receive an introduction to pathology. Equivalent Course(s): APHY 162</p> <p>CHEM 198 - Clinical Chemistry 1 Credit Units: 5.00 Your studies will focus on the principles and application of analytical techniques. These include basic light measuring systems, electrochemistry and laboratory automation. You will develop the skills needed to produce valid analytical results to assess electrolytes, carbohydrates, renal function and urinalysis. Pre-requisites: MTER 180 Minimum Grade: 60 and PROC 180 Minimum Grade: 60</p> <p>CHEM 199 - Clinical Chemistry 2 Credit Units: 3.00 You will learn advanced light measuring techniques, enzymology theory and the skills needed to produce valid results to assess cardiovascular, liver and pancreatic function. Various kit tests will be included. Pre-requisites: CHEM 176 Minimum Grade: 60</p> <p>CLIN 196 - Clinical Introduction 1 Credit Units: 2.00 You will be introduced to the clinical aspects of laboratory medicine. You will be exposed to various areas that support didactic courses being taken concurrently. Pre-requisites: CHEM 199 Minimum Grade: 60 (concurrent) and COMM 380 Minimum Grade: 60 (concurrent) and COMP 170 Minimum Grade: 60 and COMP 172 Minimum Grade: 60 and HEMA 187 Minimum Grade: 60 (concurrent) and HEMA 188 Minimum Grade: 60 (concurrent) and HSTC 187 Minimum Grade: 60 (concurrent) and HUMR 182 Minimum Grade: 60 (concurrent) and MGMT 188 Minimum Grade: 60 (concurrent) and MICR 188 Minimum Grade: 60 (concurrent) and PATH 181 Minimum Grade: 60 (concurrent) and PROC 181 Minimum Grade: 60 (concurrent) and QC 194 Minimum Grade: 60 (concurrent) and TRFS 181 Minimum Grade: 60 (concurrent)</p> <p>CLIN 197 - Clinical Introduction 2 Credit Units: 12.00 You will participate in rotations in each of the following disciplines: Hematology, Microbiology, Chemistry, Anatomical Pathology and Transfusion Medicine. Didactic theory and interpretation of clinical results will be applied to your</p>

	<p>laboratory performance and evaluations. You will have no choice as to the location of your clinical experience.</p> <p>Pre-requisites: CHEM 199 Minimum Grade: 60 and CLIN 196 Minimum Grade: CR and COMM 380 Minimum Grade: 60 and COMP 170 Minimum Grade: 60 and COMP 172 Minimum Grade: 60 and HEMA 187 Minimum Grade: 60 and HEMA 188 Minimum Grade: 60 and HSTC 187 Minimum Grade: 60 and HUMR 182 Minimum Grade: 60 and MGMT 188 Minimum Grade: 60 and MICR 188 Minimum Grade: 60 and PATH 181 Minimum Grade: 60 and PROC 181 Minimum Grade: 60 and QC 194 Minimum Grade: 60 and TRFS 181 Minimum Grade: 60</p> <p>COMM 380 - Communication in Health Care Credit Units: 2.00 You will develop the skills needed to become an effective communicator in the health care workplace. Applied written communication and oral presentation skills will be emphasized.</p> <p>COMP170 - Basic Computer Operation Credit Units: .50 or 1.00 You will be introduced to basic computer concepts. The course content includes computer components, hardware, software, working in a graphical user interface, file management, word processing and the Internet. The general skills you learn will prepare you for further courses (such as word processing, spreadsheets and presentation graphics). Equivalent Course(s): COAP 342 COMP 182</p> <p>COMP 172 -Introduction to Microsoft Word and Excel Credit Units: .50 or 1.00 You will be introduced to the purpose and uses of a word processor and electronic spreadsheets. You will develop the basic skills of creating, editing and formatting documents and spreadsheets. Equivalent Course(s): COAP 120 COAP 381</p> <p>HEMA 187 - Hematology 2 Credit Units: 2.00 Your studies will focus on the procedures used to evaluate common abnormalities in coagulation and fibrinolysis. The course content includes information about inhibitors and interpreting results to identify abnormalities detected. Pre-requisites: HEMA 190 Minimum Grade: 60</p> <p>HEMA 188 - Hemopathology Erythrocytes Credit Units: 2.00 You will learn about the pathophysiology of various anemias as related to the laboratory involvement in diagnosis and treatment. You will also learn the special laboratory tests used for differential diagnosis. You will apply this information to detect analytical discrepancies and ensure valid results. Pre-requisites: HEMA 190 Minimum Grade: 60</p> <p>HEMA 190 - Hematology 1 Credit Units: 6.00 You will focus on some of the laboratory procedures performed routinely in the clinical laboratory. These include the theory and use of small hematology analyzers and the evaluation of blood films. You will also study basic coagulation theory and testing. Pre-requisites: MTER 180 Minimum Grade: 60 and PROC 180 Minimum Grade: 60 Equivalent Course(s): HEMA 185</p> <p>HSTC 184 - Microanatomy Credit Units: 2.00 You will be introduced to the functional cells and tissue arrangements. You will</p>
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	<p>also study the microanatomical structure of the body's major organs. Pre-requisites: MTER 180 Minimum Grade: 60 and APHY 188 Minimum Grade: 60</p> <p>HSTC 185 - Histotechnology 1 Credit Units: 3.00 You will be introduced to the principles and practices of preparing clinical specimens for histological examination (including fixation, decalcification processing, embedding and microtomy). Pre-requisites: PROC 180 Minimum Grade: 60 and APHY 188 Minimum Grade: 60</p> <p>HSTC 187 - Histotechnology 2 Credit Units: 3.00 Your studies will focus on the principles and practices used in a laboratory to prepare clinical histology specimens for demonstrating cellular and non-cellular elements. Pre-requisites: HSTC 184 Minimum Grade: 60 and HSTC 185 Minimum Grade: 60</p> <p>HUMR 182 - Human and Workplace Relations Credit Units: 3.00 You will develop personal and workplace interpersonal and employability skills. The course content includes modules on teamwork, problem-solving, critical thinking, conflict resolution, stress management, personal wellness, nutrition, relating to patients, grief and loss, the legal, moral and ethical aspects of health care, health care delivery systems and basic workplace operations.</p> <p>IMMU 183 - Immunology Credit Units: 2.00 You will study the body's defense mechanisms (innate and acquired). You will discuss the involvement of the immune system in various disease states and clinical conditions. The course also provides an introduction to the principles of antigen-antibody reactions and their application in many laboratory tests. Pre-requisites: MTER 180 Minimum Grade: 60</p> <p>INFC 180 - Infection Control and Safety Credit Units: 2.00 You will study the transmission of microorganisms, blood-borne pathogens (i.e. hepatitis virus and HIV), standard precautions, isolation procedures, immunization for medical workers, sterilization and disinfection, biohazardous waste, safety and WHMIS.</p> <p>MGMT 188 - Management Practices Credit Units: 1.00 You will study health care organizational behaviour and the skills required for management roles. You will also discuss budget planning, how to use a budget and productivity and workload measurement.</p> <p>MICR 187 - Microbiology 1 Credit Units: 5.00 You will learn how to perform microbiology and antimicrobial susceptibility techniques. You will apply your skills to clinical specimens from the urinary, gastrointestinal and respiratory tracts. Isolating and identifying clinically significant microorganisms will be emphasized. Pre-requisites: PROC 180 Minimum Grade: 60</p> <p>MICR 188 - Microbiology 2 Credit Units: 3.00 You will learn how to perform isolation and identification techniques for clinically significant microorganisms from the eye/ear, genital tract, cardiovascular and central nervous systems, and skin/wound/soft tissue sites. Pre-requisites: MICR 187 Minimum Grade: 60</p>
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	<p>MTER 180 - Medical Terminology Credit Units: 1.00 You will learn to use the prefixes, suffixes and combining forms from which medical terms are derived. You will also learn to use medical abbreviations. Equivalent Course(s): MED 161</p> <p>PATH 181 - Laboratory Result Correlation Credit Units: 3.00 You will focus on the role of the laboratory in diagnosis and disease management. The course content includes the analyses used and brief descriptions of common disorders involving the various body systems. You will use this information to help you define the role of the laboratory in disease diagnosis and management. This information will assist you to detect possible discrepancies in laboratory test results. Pre-requisites: HEMA 179 Minimum Grade: 60 (concurrent) and CHEM 199 Minimum Grade: 60 (concurrent)</p> <p>PROC 180 - General Laboratory Practice Credit Units: 2.00 You will receive the theory and practice required to perform basic procedures in a laboratory. The course content includes laboratory glassware, use of balances, centrifuges, thermal equipment, pH meters, microscopes and solution preparation with related calculations. Pre-requisites: INFC 180 Minimum Grade: 60</p> <p>PROC 181 - Specimen Collection and Handling Credit Units: 2.00 You will learn how to collect, handle and transport various laboratory specimens to ensure the quality of laboratory results. The collection of blood specimens will be emphasized. You will practice capillary and venous collection on adults at various sites in the community. Pre-requisites: INFC 180 Minimum Grade: 60</p> <p>QC 194 - Quality Management Credit Units: 2.00 You will receive a complete overview of methods used to ensure the quality of laboratory results. Quality assurance and quality control techniques will be emphasized.</p> <p>TRFS 180 - Transfusion Science 1 Credit Units: 3.00 You will acquire the theory and practice needed to perform basic techniques to detect antigen-antibody reactions. You will also learn how to perform ABO forward and reverse grouping, Rh grouping and the antiglobulin test (direct and indirect). Pre-requisites: PROC 180 Minimum Grade: 60 and IMMU 183 Minimum Grade: 60</p> <p>TRFS 181 - Transfusion Science 2 Credit Units: 3.00 Your studies will focus on the theory of other blood group systems and procedures used to detect and identify antigens and antibodies. You will learn how to help diagnose, treat and prevent hemolytic disease in newborns. Diagnosing and treating immune hemolytic anemias will also be covered. Pre-requisites: TRFS 180 Minimum Grade: 60</p> <p>CHEM 285 - Clinical Chemistry 3 Credit Units: 3.00 You will study the principles of electrophoresis, chromatography and molecular biology. You will develop the skills needed to produce valid analytical results to assess proteins, osmolarity, therapeutic drug monitoring, and blood gases. Pre-requisites: CHEM 199 Minimum Grade: 60 and IMMU 183 Minimum Grade: 60</p>
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	<p>CHEM 286 - Clinical Chemistry 4 Credit Units: 19.00 You will participate in a supervised clinical experience following the hours of work at a clinical site. Upon successfully completing your experience, you will be able to perform analytical testing in a routine clinical chemistry laboratory. You will have no choice as to the location of your clinical experience. Pre-requisites: CHEM 285 Minimum Grade: 60 and CLIN 197 Minimum Grade: CR</p> <p>CLIN 284 - Clinical Hematology Credit Units: 19.00 You will participate in a supervised clinical experience following the hours of work at a clinical site. Upon successfully completing this experience, you will be able to perform analytical testing in a routine clinical hematology laboratory. You will have no choice as to the location of your clinical experience. Pre-requisites: HEMA 189 Minimum Grade: 60 and CLIN 197 Minimum Grade: CR</p> <p>CLIN 285 - Clinical Transfusion Science Credit Units: 12.00 You will participate in a supervised clinical experience following the hours of work at a clinical site. Upon successfully completing this experience, you will be able to perform analytical testing in a routine clinical transfusion science laboratory. You will have no choice as to the location of your clinical experience. Pre-requisites: TRFS 182 Minimum Grade: 60 and CLIN 197 Minimum Grade: CR</p> <p>CLIN 286 - Clinical Microbiology Credit Units: 22.00 You will participate in a supervised clinical experience following the hours of work at a clinical site. Upon successfully completing this experience, you will be able to apply basic and specific skills to the detection and identification of common microorganisms for all body sites. You will have no choice as to the location of your clinical placement. Pre-requisites: MICR 189 Minimum Grade: 60 and CLIN 197 Minimum Grade: CR</p> <p>CLIN 287 - Clinical Histotechnology Credit Units: 10.00 You will participate in a supervised clinical experience following the hours of work at a clinical site. Upon successfully completing this experience, you will be able to perform processing, cutting and staining procedures in a routine clinical histotechnology laboratory. You will have no choice as to the location of your clinical experience. Pre-requisites: HSTC 187 Minimum Grade: 60 and CLIN 197 Minimum Grade: CR</p> <p>HEMA 189 - Hemopathology Leukocytes Credit Units: 2.00 You will learn about the pathophysiology of blood diseases involving primarily leukocytes as related to the laboratory involvement with diagnosis and treatment. You will also learn the special laboratory tests used for differential diagnosis. You will apply this information to detect analytical discrepancies and ensure valid results. Pre-requisites: HEMA 190 Minimum Grade: 60</p> <p>MICR 189 - Microbiology 3 Credit Units: 3.00 You will learn how to perform the necessary techniques for the isolation and identification of the more unusual/uncommon clinically significant microorganisms (including a limited number of fungi and parasites). Pre-requisites: MICR 188 Minimum Grade: 60</p>
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	<p>TRFS 182 - Transfusion Science 3 Credit Units: 2.00 You will acquire the theory and practice needed to provide and issue compatible products for transfusions and investigating adverse effects of transfusions. Pre-requisites: TRFS 181 Minimum Grade: 60</p>
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Challenges	

