



**Medical Laboratory Science Program Handbook
Department of Biology**



Medical Laboratory Science Program Handbook Department of Biology

INTRODUCTION

This handbook was created to introduce the Medical Laboratory Science student to the program's goals, policies and procedures.

The Bachelor of Science Program in Medical Laboratory Science (Medical Technology) at the College of Staten Island is a 4- year, 128-credit program of a combination of on campus course work and 28 weeks of clinical training. Clinical training may be completed at any of our affiliate hospitals in Staten Island, Brooklyn, or Queens, Manhattan, the Bronx, Long Island, or New Jersey.

MISSION STATEMENT

The Medical Laboratory Science Program at the College of Staten Island is committed to providing the highest quality of education in the field of Clinical Laboratory Science. The program prepares competent entry-level laboratory professionals with the technical skills necessary to become productive members of the health care team.

PROGRAM GOALS

- To provide students with the necessary coursework and clinical training for entry-level work as a Clinical Laboratory Scientist
- To ensure that students graduate with skills that allow them to become responsible professionals as they perform procedures with precision and accuracy;
- To ensure that graduates have the skills necessary to succeed in large institutions as well as point of care testing sites
- To provide students with the appropriate knowledge to qualify for New York State licensure and national certification examinations.

Graduates of the Medical Laboratory Science program are eligible for certification by the ASCP-BOC examination and for New York State Licensure. Granting of the B.S. degree in Medical Laboratory Science is not contingent upon passing an external certification or obtaining licensure.

New York State Education Department

The CUNY College of Staten Island Medical Laboratory Science is registered with the New York State Education Department as a CLS licensure-qualifying program.

New York State Education Department Office of the Professions (NYSED OP)

PO Box 22063
Albany, NY 12201
www.op.nysed.gov

National Accrediting Agency for Clinical Laboratory Science

The CUNY College of Staten Island Medical Laboratory Science program is accredited by the National Accrediting Agency for Clinical Laboratory Science (**NAACLS**). The program is required to comply with NAACLS standards for MEDICAL LABORATORY SCIENCE. To view a copy of the MLS standards please visit the NAACLS website at www.naacls.org.

National Accrediting Agency for Clinical Laboratory Sciences

5600 N. River Road
Suite 720
Rosemont, IL 60018-5119
Phone: 773-714-8880

TUITION/WITHDRAWAL/REFUND POLICIES

See the CUNY College of Staten Island Website for the most current information regarding tuition, refunds and withdrawal dates. The undergraduate academic calendar can be accessed through the website: <http://csicuny.smartcatalogiq.com/en/current/Undergraduate-Catalog/Tuition-and-Fees>

All tuition and fees listed in the Catalog and in any registration materials issued by the College are subject to change without prior notice by action of the CUNY Board of Trustees.

All tuition and fee schedules are necessarily subject to change without notice, at any time, upon action by the Board of Trustees of The City University of New York regardless of tuition and fee schedules in effect at the time of this printing.

MLS PROGRAM OFFICIALS AND FACULTY

Program Director:	Adrienne Paez, MS, MT (ASCP) Room 6S-136A 718-982-3961 Adrienne.Paez@csi.cuny.edu
Clinical Coordinator:	Nancy Liu-Sullivan, Ph.D. Room 6S-136A 718-982-4189 Nancy.LiuSullivan@csi.cuny.edu
Biology Chairperson:	Chang-Hui Shen, Ph.D. Room 6S-143 718-982-3853 Changhui.Shen@csi.cuny.edu

Program Faculty:

MLS Faculty:

Adrienne Paez, MS, MT (ASCP)
Chang-Hui Shen, Ph.D., Biology Chairperson
Nancy Liu-Sullivan, Ph.D., Biology Faculty
Carol Hartman, MS, MT (ASCP)
Barbara Davis, Ph.D., MT (ASCP) Adjunct instructor
Arthur Philipps, MT, MS, BB(ASCP), Adjunct Instructor
Tom Neglia, MT, MHA Adjunct Instructor
Linda Panyu, MS, M (ASCP), SM(ASCP) Adjunct Instructor
Mary Fedele, MT, MPA– Adjunct instructor

Professional Development:

MLS faculty are required to participate in professional development annually. Documentation of Professional Development may include; continuing education units, membership and participation in professional organizations, attendance at conference or workshop. Faculty should submit documentation of Professional Development (of at least 4 hours of CEU credits), via email to the Program Director, prior to the start of every fall semester.

Advisory Board:

The function of the advisory board is to:

- Review programs mission statement, objectives and goals.
- Review curriculum and give recommendations for changes, updates, as needed.
- Review any significant changes to program policies.
- Assess program's ASCP-BOC pass rates, graduation rates, employment rates and employer satisfactory to give recommendations for improved outcomes.
- Provide feedback to Program Director, Clinical Coordinator and program officials.

Clinical Education Affiliates:

Staten Island

Northwell Health-Staten Island University Hospital (Staten Island, NY)

Brooklyn

NYU Langone Hospital-Brooklyn

New York Community Hospital

Interfaith Medical Center

Empire City Laboratories

Bronx

Montefiore Medical Center

Queens

Elmhurst City Hospital

Northwell Health Laboratories, Bayside

Manhattan

Northwell Health-Lenox Hill Hospital

Harlem Hospital

Memorial Sloan Kettering Cancer Center

New Jersey

Hackensack University Medical Center

Long Island

Northwell Health-Long Island Jewish Hospital, New Hyde Park

Admissions Criteria and Retention

1. Minimum of 3.0 GPA (4.0 scale) overall GPA or higher.
2. Application (<https://www.csi.cuny.edu/academics-and-research/departments-programs/biology/medical-technology>)
3. A minimum of two recommendation letters from college professors
4. Personal statement describing why you are interested in the field of Medical Laboratory Science; include personal and professional goals
5. The MLS program begins in the Fall semester only. Students enter program in fall and progress through program as a cohort.
6. Complete applications are due February 15th prior to fall start date
7. Meeting the admissions criteria does not guarantee acceptance into the program. The program is competitive and there are a very limited number of seats available each year. Enrollment is based on the number of clinical education spots available.

The Medical Laboratory Science Program has thirteen clinical affiliates which can accommodate approximately up to twenty students. In the unlikelihood that a student cannot be placed, and the number of eligible students exceeds that of available training sites, every effort will be made to arrange training at additional private or diagnostic labs with an affiliation agreement.

If an additional site cannot be secured, students will be selected for clinicals based on grades. Those with the highest GPAs will be placed first. If a student is not placed, he/she will have first priority in the following semester.

If a clinical site faces closure, the students will be permitted to finish their current rotation. Once complete, they will be reassigned to a new clinical education site.

Attendance Policies for MLS Didactic Courses

Attendance is mandatory for the entire program; absences from lecture and/or laboratories are limited to 2 (TWO) per semester. Students with more than the allowed numbers of the absences may face failure or unofficial withdrawal of the course. Missed laboratory work must be made up at the instructor's discretion. Make-up examinations are at the discretion of the instructor.

Prolonged illness (three consecutive days or more) must be accompanied by a doctor's note or other acceptable proof of absence. Any make-ups are at the discretion of the instructor or laboratory director.

Retention

Retention in the MLS Program

Students are required to maintain a 3.0 overall cumulative CUNY College of Staten Island GPA and a 3.0 GPA in Medical Laboratory Science courses to remain in good standing in the MLS Program. If a student's GPA falls below the required, the student will be placed on academic probation and will have one semester to increase their GPA. If the student is unable to do so, they will be dismissed from the program.

Students must pass all MLS courses with a grade of C or better. If a student fails an MLS course or receives a D, that student is allowed to repeat the class one more time. A student will be given a written warning letter and put on academic probation. In the event of failure to achieve a C or better, the second time, the student will be dismissed from the program and will not be permitted to reapply to the program.

Academic requirements for MLS students are somewhat different from those of students in other programs. Faculty are expected to act as gatekeepers to the profession, ensuring graduates meet not only the academic expectations of the profession but also the professional expectations.

ASCLS (American Society for Clinical Laboratory Science) refers to this as professional conduct. Students in both the classroom and clinical education field are expected to behave in a manner that is respectful of other students, staff, and faculty, and to conduct themselves in accordance with the ASCLS Code of Ethics. <https://ascls.org/about-us/code-of-ethics>. Failure to do so is a strong indicator of a lack of readiness for entry into the medical laboratory science profession and consequently may result in termination from the Program.

If a student is not performing to academic or professional expectations, or is unable to master basic knowledge or skills, or has violated the ethical standards of the profession, the academic instructor will report the difficulties to the MLS Program Director. Difficulties specifically relating to clinical education will also be reported by the Clinical Education Liaison to the MLS Clinical Coordinator and MLS Program Director. Regardless of where difficulties arise, it is the responsibility of the faculty, and/or Clinical Education Liaison to request a meeting of the Medical Laboratory Science Academic Review Committee. The Academic Review Committee may impose specific conditions to support the student in succeeding academically and professionally, place the student on probation, or terminate the student from the program.

Grade Appeals

The College of Staten Island policy on grade appeals is as follows;

Students wishing to appeal a grade other than WU or FIN must do so within 60 school days, excepting summer session, following the end of the semester. Appeals must be submitted in writing to the chairperson of the department in which the course was offered. Upon receipt of the appeal, the chairperson shall direct the student to discuss the issue with the instructor who assigned the grade. If the issue remains unresolved, the student may request a review by the Department Committee on Grade Appeals.

This Committee on Grade Appeals shall review all information presented by the student and shall meet with the instructor. The committee shall render a decision within 30 days after the student requested the grade review by the committee because the student and instructor had not resolved the matter. If the committee upholds the appeal by a vote of 3-0, the chairperson shall change the grade to reflect the decision of the committee. If the committee does not uphold the student, there is no further appeal within the College.

In all deliberations on grade appeals, the burden shall be on the student to prove that a violation of the College's regulations occurred or that the instructor's own stated criteria for grading, which shall have been enunciated at the beginning of the semester, have not been followed. Students needing advice on the procedure may consult an academic and personal counselor.

Students wishing to have a WU or a FIN grade changed to a grade of W must file a written petition supported by documentation to the Committee on Course and Standing.

Problem Resolution, Termination and Appeal Process

As with all academic programs, a student in the MLS program can be dismissed for failing to perform academically in accordance with the standards established by the College and the Program. Violations of academic integrity also may result in a lower grade or failure in a course and in disciplinary actions with penalties such as suspension or dismissal from the Program or College (see *CSI Undergraduate Catalog* or *The Gazetteer* for a fuller explanation).

Academic requirements for MLS students are somewhat different from those of students in other majors. In the MLS program, a student must earn a grade of C or higher in all MLS courses. Students may not continue in the program until satisfactory grades are earned. Students with lower grades have one opportunity to repeat a course in which they have performed poorly, but credit may only be earned once. Students cannot be placed in the clinical education internship until all professional courses that precede clinical placement have been completed at a satisfactory level. Consistently low grades may be grounds for probation and/or dismissal from the program.

In the MLS Program, there are criteria, in addition to academic performance, which determine whether a student can continue in the program. Students in both the classroom and field are expected to behave in a manner that is respectful of other students, staff, and faculty, and to conduct themselves in accordance with the *ASCLS Code of Ethics*. Students will be evaluated and graded on affective behavioral objectives. Failure to meet satisfactory performance is a strong indicator of a lack of readiness for entry into the medical laboratory science profession and consequently may result in termination from the Program.

Academic Review Committee and Termination from the MLS Program

If a student is not performing well academically, or is unable to master basic knowledge or skills, or is unable or unwilling to uphold the ethical standards of the profession, the academic instructor will report the difficulties to the MLS Program Director. Difficulties specifically relating to clinical education placement will be reported by the clinical education liaison to the MLS Clinical Coordinator and MLS Program Director. Regardless of where difficulties arise, it is the responsibility of the faculty advisor to request a meeting of the MLS Program's Academic Review Committee (ARC).

The ARC will meet as soon as practical to discuss the difficulty and determine appropriate action. The student will be asked to submit any written material prior to the meeting that may shed light on the issues. The student will also have the opportunity to be present at the meeting to respond to the concerns of the faculty, but will not be present during deliberations and decision-making.

If the Committee determines that the difficulty can be resolved in a timely manner, consistent with Program and professional standards, a problem resolution plan will be developed by the Committee. The advisor will monitor the student's progress and request that the Committee reconvene if the difficulty continues, or the student is still not progressing satisfactorily. A problem resolution plan may not be appealed. A student who refuses to follow the plan will be dismissed from the program.

If the Committee determines that, in its academic and professional judgment, the student is not meeting the standards of the program and the profession at the level expected of an undergraduate medical laboratory science student, and that the difficulty is unlikely to be resolved quickly and satisfactorily with a problem resolution plan, the MLS Program Director will notify the student by registered mail, within 14 days of the Committee meeting, that the student will be terminated from the MLS Program.

Refusal to participate in an ARC is grounds for dismissal from the MLS Program.

Appeal of MLS Program Decision

ARC Appeals Students have the right to appeal the ARC's decision. Written requests to appeal an ARC decision must be submitted to the Department Chair within ten working days after written notification of the ARC's decision. The grounds for appeal are: new information has become available that was not available during the first appeal and/or the program violated its stated procedures or those of the College.

Appeals Process of an MLS Program Decision

The student must send a letter stating a desire to appeal the decision of the ARC to the Department Chair that gives the date of decision and the grounds for the appeal as above. This letter must be received within ten working days after the ARC's written notification of its decision.

This request is read by the Chairperson. If the Chairperson decides to go forward with the appeals process, the student must submit all potentially helpful material consistent with the grounds for appeal.

First, a decision is made, based on written material submitted, as to whether to consider the appeal further or reject consideration of the appeal.

If the decision is to reject consideration of the appeal, the Chairperson notifies the student in writing.

If the decision is to hear the appeal, the Chairperson decides whether to meet with the student, the faculty advisor or the field instructor as part of the review of the decision of the Academic Review Committee.

If the appeal has been considered, the Chairperson notifies the student of the outcome in writing within ten working days after submission of the request for an appeal.

Grievance Procedure

If a student has a grievance related to any aspect of the MLS Program, the first step of attempted resolution is with the person directly involved. It is hoped that most problems can be resolved at this level. If discussion at this point fails to resolve the matter, the student should discuss it with the Director of the MLS Program, or with the Chair of the Department of Biology, if it is the MLS Program Director with whom the student has the grievance. If the complaint involves a review of instruction or a review of grades, the student is to follow the grievance procedures outlined in the CSI Student Handbook. If a grievance is unresolved for the student by these processes, the student can contact the Office of Student Services.

TECHNICAL STANDARDS & ESSENTIAL FUNCTIONS

Students must meet the following non-academic technical standards and essential functions;

- **Vision**
The student must be able to read charts and graphs, read instrument scales, discriminate color, read microscopic materials, and record results.

- **Speech and hearing**
The student must be able to communicate effectively and sensitively in order to assess non-verbal communication and be able to adequately transmit information to all members of the health care team.

- **Fine motor functions**
The student must process all skills necessary to carry out diagnostic procedures, manipulate tools, instruments and equipment.

- **Psychological Stability**
The students must possess the emotional health required for full utilization of the applicant's intellectual abilities. Must be able to recognize emergency situations, and take appropriate actions

AFFECTIVE OBJECTIVES

Attendance:

1. Arrives to every class on time.
2. Attends class on regular basis.
3. Informs instructor when late or absent prior to class.

Initiative/Interest:

1. Always prepared for class.
2. Never leaves class early.
3. Frequently asks pertinent questions.
4. Often participates in discussions.
5. Is alert and attentive.
6. Always completes required assignments.

Communication/Cooperation:

1. Asks relevant questions.
2. Consistently follows oral and written directions.
3. Demonstrates effective oral and written communication skills.
4. Assists other students when necessary.

Self Confidence/Responsibility:

1. Demonstrates consideration during interaction with others.
2. Ability to work with other students or independently.
3. Displays appropriate level of confidence (student is not under or over confident).
4. Maintains composure under pressure.

Integrity/Professional Conduct

1. Always adheres to policies and procedures documented in the CUNY catalog and Medical Laboratory Science Handbook.

**PROGRAM CURRICULUM
THE COLLEGE OF STATEN ISLAND
DEPARTMENT OF BIOLOGY**

**Bachelor of Science Medical Laboratory Science
MLS CURRICULUM 2020-2021**

Total Credits Required 128

Suggested course flow:

I. Required Pre-Major Courses

- ENG 111 INTRODUCTION TO COLLEGE WRITING (3 CREDITS)
- MTH 123 COLLEGE ALGEBRA & TRIGNOMETRY (4 CREDITS)
- BIO 170 GENERAL BIOLOGY I (3 CREDITS)
- BIO 171 GENERAL BIOLOGY I LAB (1 CREDIT)
- CORE 100 UNITED STATES ISSUES, IDEAS, & INSTITUTIONS (3 CREDITS)
- WORLD CULTURES & GLOBAL ISSUES (3 CREDITS)
- ENG 151 COLLEGE WRITING (3 CREDITS)
- BIO 150 HUMAN ANATOMY & PHYSIOLOGY I (4 CREDITS)
- CHM 141 GENERAL CHEMISTRY I (3 CREDITS)
- CHM 121 GENERAL CHEMISTRY I LAB (1 CREDIT)
- PHL 130 INTRODUCTION TO ETHICS (3 CREDITS)
- CREATIVE EXPRESSION (3 CREDITS)
- BIO 160 HUMAN ANATOMY & PHYSIOLOGY II (4 CREDITS)
- CHM 142 GENERAL CHEMISTRY II (3 CREDITS)
- CHM 127 GENERAL CHEMISTRY II LAB (1 CREDIT)
- 200-LEVEL SOCIALSCIENCE OR TEXTUAL, AESTHETIC & LINGUISTIC ANALYSIS (4 CREDITS) first of two courses required in this group for total of 8 credits
- ELECTIVE (5 CREDITS)
- MTH 214 APPLIED STATISTICS USING COMPUTERS (4 CREDITS) or
BIO 272 BIOMETRICS (4 CREDITS)
- BIO 314 GENERAL MICROBIOLOGY (4 CREDITS)
- CHM 250 ORGANIC CHEMISTRY I (5 CREDITS)
- 200-LEVEL SOCIALSCIENCE OR TEXTUAL, AESTHETIC & LINGUISTIC ANALYSIS (4 CREDITS) second of two courses required in this group – total of 8 credits)

II. Medical Laboratory Science Major Courses

- MLS 335 CLINICAL MICROBIOLOGY (4 CREDITS)
- BIO/MLS325 DIAGNOSTIC MOLECULAR BIOLOGY (4 CREDITS)
- MLS 305 CLINICAL HEMATOLOGY (4 CREDITS)
- MLS 315 CLINICAL LABORATORY CHEMISTRY (4 CREDITS)
- CHM 240 ANALYTICAL CHEMISTRY (4 CREDITS)
- MLS 345 IMMUNOHEMATOLOGY (4 CREDITS)
- MLS 355 442 IMMUNOLOGY/SEROLOGY (4 CREDITS)
- MLS 365 PARASITOLOGY/MYCOLOG/VIROLOGY (3 CREDITS)
- MLS 375 URINALYSIS/BODY FLUIDS (2 CREDITS)
- MLS 385 LABORATORY OPERATIONS & MANAGEMENT (3 CREDITS)
- MLS 395 MEDICAL TECHNOLOGY COMPREHENSIVE REVIEW (3 CREDITS)
- MLS 410 CLINICAL TRAINING – MICROBIOLOGY (4.5 CR)- 6 weeks
- MLS 420 CLINICAL TRAINING – BLOOD BANK (4.5 CR) – 6 weeks
- MLS 430 CLINICAL TRAINING – IMMUNOLOGY/SEROLOGY (1.5 CR)-2 weeks
- MLS 440 CLINICAL TRAINING –HEMATOLOGY/COAGULATON (5 CR) – 7 weeks
- MLS 450 CLINICAL TRAINING- CHEMISTRY (4 CR) – 5 weeks
- MLS 460 CLINICAL TRAINING – URINALYSIS/BODY FLUIDS (1.5 CR) – 2 weeks

MEDICAL LABORATORY SCIENCE COURSE DESCRIPTIONS

MLS 3335 Clinical Microbiology: 3 class hours, 3 laboratory hours, 4 credits. Principles of clinical and diagnostic microbiology; a study of host microbe interactions, the principles and applications of the immune response, the epidemiology of infectious disease and the pathogenesis of the major microbial diseases. In the laboratory, procedures used in laboratory diagnosis are applied.

BIO/MLS 325 Diagnostic Molecular Biology: 3 class hours, 3 laboratory hours; 4 credits. This course will address the theoretical and practical framework for the understanding and application of molecular biology techniques in the clinical laboratory. The course material will cover the principles and applications of recombinant DNA technology including DNA-DNA hybridization, DNA amplification and nonradioactive in situ hybridization (HISH) for the detection and identification of microorganisms associated with infectious diseases.

MLS 305 Clinical Hematology: 3 class hours, 3 laboratory hours; 4 credits: Introduction to the study of hematology with emphasis on the formation and function of normal blood cells; identification of normal and abnormal blood cell types, variations in blood picture associated with hematologic disorders, and hemostasis and coagulation. Laboratory practice includes complete blood counts, studies of peripheral blood and bone marrow smears, special tests for hematologic disorders, and basic coagulation procedures.

MLS 315 Clinical Laboratory Chemistry: 3 class hours, 3 laboratory hours; 4 credits

An introduction to the concepts of Clinical Chemistry. Topics include basic laboratory math, the renal system, digestive system with liver function, respiratory system and the endocrine system. Emphasis is on clinical tests which evaluate the function of these systems. Analytes and lab results are correlated to normal homeostasis and disease. Analyte measurements are studied and described in reference topics such as metabolism, protein synthesis, acid-base balance, electrolyte balance, enzymes, and hormones

CHM 240 Analytical Chemistry: 2 class hours, 4 laboratory hours, 4 credits. A study of the quantitative aspects of chemical changes chemical equilibria, the stoichiometry and energetics of chemical reactions, theory and laboratory in volumetric, opticometric, electrostatic, and kinetic methods of chemical analyses. Also included is an introduction to instrumental methods of analysis.

MLS 345 Immunohematology: 2 class hours, 4 laboratory hours; 4 credits: This course explores the major blood group systems that impact the practice of transfusion medicine and examines the processing and distribution of blood products supplied by transfusion services. Laboratory practice includes duplicate testing for blood groups, cross-matching, antibody screening, hepatitis antigen testing, component preparation, and other significant tests

MLS 355 Immunology/Serology: 2 class hours, 4 laboratory hours, 4 credits.

This course introduces the immune system's components, functions, interactions with microorganisms, and the clinical applications of immunologic assays to human health and disease. Emphasis is placed on basic principles of immunologic and serodiagnostic techniques and concepts of cellular and humoral immunity in health and disease.

MLS 365 Parasitology/Mycology/Virology: 3 class hours. A survey of the major human parasites, medically significant molds/yeasts, and human viruses. This course will introduce the student to the fundamentals in taxonomy, morphology, and pathogenesis. Emphasis is on the role of parasites, fungi/yeast and viruses in identification and laboratory testing.

MLS 375 Urinalysis/Body Fluids: 2 class hours. Introduction to the laboratory analysis of urine and body fluids as well as the physical, chemical and microscopic examination of urine and body fluids such as cerebrospinal, semen, synovial, serous, and amniotic fluid. The course will focus on the analysis and interpretation of test results and the correlation of these results to pathology

MLS 385 Laboratory Operations and Management: 3 hours, 3 credits. This course is designed to prepare Medical Laboratory Science students for career advancement in the laboratory, beyond entry level employment. Students will develop a comprehensive understanding of Principles of Laboratory Management, Operations, Human Resource Management, Financial Management, and Strategies for Career Success. Included among these are an understanding of ethical issues in laboratory management, career planning, managerial problem solving and decision making, and education techniques. This course utilizes a web-based approach. All learning activities are asynchronous

MLS 395 ASCP Comprehensive Review: for 3 class hours, 3 credits.
This course is designed to help the medical laboratory science student prepare for the MLS (ASCP-BOC) exam. This course utilizes a web-based approach to assigned CAT practice tests and assess readiness for each discipline of Medical Laboratory Science

Clinical Education Rotations (28 weeks total, 14 weeks per semester):

- Blood Bank: 6 weeks
- Microbiology: 6 weeks
- Immunology/Serology: 2 weeks

- Clinical Chemistry: 5 weeks
- Hematology/Coag: 7 weeks
- Urinalysis/Body Fluids: 2 weeks

CLINICAL EDUCATION TRAINING GUIDELINES AND REQUIREMENTS

All clinical education instructors are appropriately credentialed technologists

Pre-requisites:

Students must have successfully completed all other requirements for graduation and have a GPA of at least 3.0 in Medical Laboratory Science courses, have an overall GPA of at least 3.0 and permission from the Director of the MLS program.

Course Description

The students will rotate through all of the following six laboratory disciplines: Hematology/Coagulation, Immunohematology, Clinical Chemistry, Urinalysis/Body Fluids, Microbiology, and Immunology/Serology. They will also observe Molecular Diagnostics procedures within these disciplines. Additional areas of the laboratory, such as Histology, Cell Therapy, Cytogenetics are at the discretion of the affiliate and are encouraged. Students may be permitted to observe these laboratories as electives, time permitting.

Clinical Education Attendance

Punctual attendance and participation in all clinical rotations are essential and required. The training schedule follows the schedule of the clinical education affiliate. Clinical training days including holiday schedule and sick days, follows that of the training hospital.

The student is required to notify the clinical education liaison, Program Director and Clinical Coordinator if a lateness or absence is anticipated.

If more than 3 days of the training time is missed (including absences due to medical, family or personal reasons) it is at the clinical supervisor's discretion to decide whether the student is allowed to make up for the missing time. If not, the student will have to repeat the entire rotation for the designated area. There is no guarantee that an immediate rotation spot can be provided.

Prolonged illness (three consecutive days or more) must be accompanied by a doctor's note or other acceptable proof of absence. Make-ups are at the discretion of the instructor and laboratory director.

Should the student be dismissed by the training hospital due to disciplinary issues, the student may also be dismissed from the CSI Medical Laboratory Science program.

Clinical Education (Psychomotor) Objectives:

At the end of the clinical rotation the student will be able to:

I. Immunohematology (Blood Bank)

1. Perform the following management functions:
 - a. Process specimens with detail to proper identification of patient; name, account number, labeling.
 - b. Observe specimen accessioning in blood bank information system.
 - c. Keep neat and accurate records
 - d. Efficiently organize daily work load
 - e. Communicate effectively between staff members and peers

2. Blood Bank Reagents and Worksheets
 - a. Examine blood bank reagents for lot number, expiration date and review package inserts.
 - b. Prepare 2-4% RBC saline suspensions and wash according to SOP.
 - c. Perform daily reagent quality controls with positive and negative controls.

3. Accurately perform, interpret results, discuss principles, significance and sources of error for:
 - a. ABO forward and reverse typing
 - b. Rh, Weak D (Du) and Rh phenotyping
 - c. Rare antigen typing
 - d. Use of lectins and neutralizing reagents
 - e. Antibody screening and identification of antibodies
 - f. Titration of antibodies
 - g. Elution and adsorption techniques
 - h. Acid elution test
 - i. Direct and indirect Coombs
 - j. Crossmatch procedures; routine, fetal and emergency
 - k. Enzyme treated cells
 - l. Investigation of transfusion reactions
 - m. Type, group and crossmatch
 - n. Perform cord blood profile
 - o. LISS/PEG/Albumin
 - p. Automated Systems
 - q. LIS

4. Blood Donors and Inventory Management (when available);
 - a. Participate in the processing of blood donors;
preliminary questioning, physical examination, medical history and physical criteria that would exclude an allogenic donor

- b. Observe donor screening test result entry, audit and labeling processes
5. Perform necessary blood bank tests including selection of compatible blood for a problem patient with;
 - a. Irregular antibodies
 - b. Autoimmune antibodies; Cold reacting, warm reacting and drug induced
6. Perform daily maintenance, set up and QC of blood bank instruments and record results accurately
7. Troubleshoot and perform preventative maintenance of equipment
8. Perform quality control as it pertains to the Blood Bank laboratory including;
 - a. Keep neat and accurate records
 - b. Maintain equipment
 - c. Test commercial antisera daily
 - d. Check reagents storage and labels daily
 - e. Monitor centrifuges, refrigerators, freezers, heat blocks and water baths
 - f. Check proper storage requirements for donors and recipients of blood transfusion

II. Hematology/Coagulation

The student will be able to:

1. Perform management functions of the department including:
 - a. Processing of specimens including collection and transport
 - b. Efficiently organize daily workload
 - c. Plan a supply inventory
 - d. Communicate effectively between staff members and peers
 - e. Screen, interpret and fill laboratory results into LIS (without reporting and while under supervision)
2. Perform quality control measures by:
 - a. Keeping neat and accurate records
 - b. Reporting the appropriate patient results while under supervision
 - c. Monitoring equipment found in hematology lab
 - d. Using both internal and external control systems
3. Perform with accuracy (2SD) and within the allotted time the following;
 - a. ESR
 - b. Reticulocyte count; manual and automated
 - c. RBC count
 - d. WBC count
 - e. Platelet count from a prepared smear
 - f. Slide differentials

4. Laboratory instruments:
 - a. Demonstrate the ability to operate, set up and perform daily maintenance
 - b. Run controls, record and interpret results
 - c. Trouble shoot when controls are out of range and perform the necessary steps to rectify the situation
 - d. Interpret cytograms
 - e. Report, under supervision, critical values and correctly enter results into LIS
 - f. Identify patient result criteria for screening slides vs performing a manual differential
 - g. Change reagents, document actions
 - h. Interpret histogram patterns as seen on the automated instrument
 - i. Be proficient in documenting problems pertaining to the LIS

5. Calculate and state clinical significance, when applicable, to the following;
 - a. Manual RBC, WBC (usually from body fluids)
 - b. Reticulocyte %
 - c. Absolute reticulocyte count
 - d. Corrected reticulocyte count
 - e. Reticulocyte index
 - f. Corrected WBC
 - g. Absolute value for any cell line
 - h. MCV, MCH, MCHC
 - i. Dilution problems

6. Perform and estimate platelet count to be compared with results from automated instrument

7. Construct a flow chart outlining the hemostasis mechanism

8. Construct a flow chart for laboratory evaluation of the intrinsic pathway. Identify the reagents needed, discuss potential sources of error, principles of test and give interpretation of test results. Recite normal value for the following laboratory tests:
 - a. Whole blood clotting time
 - b. PTT vs APTT
 - c. Factor assays
 - d. Correction/mixing studies

9. Construct a chart using the criteria listed in #8 above for the following laboratory results;
 - a. PT and INR
 - b. Stypven time

- c. Factor assays
 - d. Correction studies
 - e. Define INR
10. Construct a chart using the criteria in #8 above for the following laboratory evaluation of Fibrin formation, include the following results;
- a. Thrombin time
 - b. Fibrinogen assays
 - c. Fibrin stabilizing factor
11. Construct a chart using the criteria in #8 above for the following laboratory evaluation of fibrin formation, include the following lab tests:
- a. Clot lysis test
 - b. Euglobulin lysis
 - c. FDP
 - d. D-dimer
 - e. Thrombin time
 - f. Plasminogen
12. Perform daily maintenance, set up QC for coagulation instruments and accurately record results
13. Troubleshoot and perform preventative maintenance of equipment

III. Clinical Chemistry

The student will be able to:

1. Perform management functions of the department including;
 - a. Processing specimens including collection and transport
 - b. Organization of daily workload
 - c. Proper identification and verification of patient samples
 - d. Communicate effectively between staff members and peers
 - e. Properly handle patient specimens with respect to:
 - Preservation
 - Observation of abnormalities (hemolysis, unusual color)
 - Proper anticoagulant used if applicable
 - Sample variation
 - Transportation
 - Quality assurance
2. Calculate the following;
 - a. Percent solutions
 - b. Molar solutions
 - c. Normal solutions

- d. Equivalent weights
 - e. Conversion of units
 - f. Clearance tests
3. Perform calibrations, use and differentiate between general laboratory equipment
 - a. Manual pipettes
 - b. Techniques of pipetting
 - c. Automatic dispensers
 - d. Volumetric flasks
 - e. Micropipettes
 - f. Centrifuges
 4. Perform calculations involving dilution of reagents and patient samples.
 5. Calculate the following;
 - a. Mean
 - b. Standard variation
 - c. Coefficient of variation
 6. Set up protocols for evaluating new methodologies.
 7. Participate, observe and outline proficiency testing methods as it pertains to the clinical chemistry laboratory.
 8. Interpret Levy-Jennings charts recognizing shifts, trends and out of range resulting, taking corrective actions when required.
 9. Operate equipment (under supervision) performing start up, maintenance, and daily quality control utilizing proper documentation and protocols of the laboratory instruments.
 10. Accurately report, record and evaluate the following final results into the LIS including criteria for handling critical values:
 - a. Carbohydrate metabolism; Glucose, lactate
 - b. Renal function tests; Creatine, clearance function tests, uric acid, BUN
 - c. Liver function tests; bilirubin, urobilinogen
 - d. Protein; total protein, albumin, triglycerides, cholesterol, phospholipid, lipoprotein
 - e. Enzymes for myocardial infarction, hepatitis disease, muscle disease, bone disease, pancreatitis
 11. Report, record and evaluate minerals and trace element values for;
Na, K, Cl, Ca Fe, Mg

12. Report, record and evaluate endocrinology values for;
 - a. Pituitary hormones
 - b. Thyroid
 - c. Adrenocortical
 - d. Female sex hormones
 - e. Male sex hormones
 - f. Pancreatic
 - g. andrenomedullary

13. When available, report, record and evaluate values for;
 - a. Therapeutic Drugs,
 - b. Toxicological Studies,
 - c. Radioimmunoassay (RIA)

IV. Urinalysis/Body Fluids

The student will be able to:

1. Perform macroscopic evaluation of urine:
 - a. Verify quality control accuracy
 - b. Demonstrate proficiency in use of automated equipment, demonstrate maintenance and function checks
2. Perform microscopic examination of urine:
 - a. Demonstrate proficiency in use of the microscope in sediment examination
 - b. Correctly identify cells, crystals and casts and state clinical significance
3. Quality Assurance/Control. Participate in and explain the following functions;
 - a. Proper identification of specimens
 - b. Maintaining set up, run controls, and record results daily for instrumentation
 - c. State and utilize criteria for;
 - Performing microscopic examinations
 - Communication critical values
 - Utilizing the laboratory computer and entering results under direct supervision
4. Safety – participate in;
 - a. Proper specimen processing
 - b. Disinfection and decontamination methods
 - c. Chemical hazards as it pertains to Urinalysis test area
 - d. Proper disposal of laboratory waste
 - e. Proper disposal of sharps/glass

5. Perform a cell count and differential, compare results with supervising technologist

V. Microbiology

The student will be able to;

1. Demonstrate proper methods and collection of specimens, and measures used to avoid contamination
2. Discuss collection and properly handle and process specimens with emphasis on;
 - a. Proper container
 - b. Communication with other members of healthcare team
 - c. Proper technique
 - d. PPE
3. Discuss the handling and culturing of; blood, CSF, body fluids, throat, sputum, wound, urine, stool, eye, ear, etc., including pathogenic organisms as well as normal flora encountered in each specimen
4. Identify the different types of media used for the isolation of pathogens that may be found in the above listed specimens
5. Techniques for safely handling and disposing of infectious material
6. Prepare reagents in bacteriology lab
7. Accurately perform staining procedures and interpret results of the smear for:
 - a) Gram stain
 - b) Acid-fast stain
 - c) India ink preparation
8. Discuss methods of obtaining pure cultures by:
 - a) Media selection
 - b) Streak plate techniques
9. Inspect, calibrate and replace inoculating loops and needles, glassware, centrifuges and microscopes
10. Perform antimicrobial susceptibility testing and explain principle, methodology, quality control and interpretation and the Kirby Bauer method.
11. Set up, work up and identify unknown organisms accurately when compared to the supervising technologist's results.
12. Operate under supervision, perform start up, quality control and daily maintenance, with proper documentation. Accurately interpret the results of automated laboratory instruments.

VI – Parasitology

The student will be able to:

1. Diagram and discuss; life cycle, name of parasitic disease, clinical symptoms, identification of diagnostic states, specimen type and processing of specimen for the following;
 - a. Protozoa; Plasmodium, Leishmania, Trypanosoma, Babesia, Toxoplasma, Isospora, Iodamoeba, Dientamoeba, Balantidium, Endolimax, Cryptosporidium, Acanthamoeba, Giardia, Trichomonas, Chilomastix
 - b. Nematodes; Ascaris, Necator, Ancliyostoma, Stronglyoides, Enterobius, Trichuris, Trichinella, Dracunculus
 - c. Trematodes; Schistosoma, Paragoniumus, Clonorchis, Fasciola
 - d. Cestodes; Diphylobothrium, Taenia, Echinococcus, Hymenolepsis, Cysticercus
2. Prepare specimens for parasitological examination
3. Identify unknowns from stock cultures or images from lectures and lab.

VII - Immunology/Serology

The student will be able to;

1. Calculate and perform serological dilutions
2. Perform quality control including;
 - a. Keeping accurate and neat records
 - b. Reporting patient results under direct supervision
 - c. Documenting abnormal results as well as corrective measures, if taken
3. Prepare serological reagents; test them with known positive and negatives
4. Accurately perform and interpret results for the following;

a. VDRL	e. urine pregnancy
b. CRP	f. direct/indirect fluorescent microscopy
c. RA	g. ELISA
d. Monospot	h. automated immunoassay
5. Operate under supervision, perform start up, quality control and daily maintenance, with proper documentation. Accurately interpret the results of automated laboratory instruments
6. Analyze the below listed tests; include principle of test, reagents used, clinical application and significance, normal and abnormal results. State specimens that correlate with each test and list the pathologies associated with each.

a. Syphilis	g. Autoimmune disease
b. Hepatitis	h. Pregnancy
c. CRP	i. Thyroid function
d. Rheumatoid arthritis	j. Streptococcal antibodies
e. Infectious mononucleosis	k. Febrile agglutination
f. Antibody testing	

VIII-Molecular Diagnostics

The student will be able to

1. Observe and perform at least two of the following tests;
 - a. Western, Southern or Northern blot
 - b. PCR (polymerase chain reaction)/NAT (nucleic acid testing)
 - c. DNA and RNA probes
 - d. FISH
 - e. ELISA

The specific areas of proficiencies all training students are required to acquire and successfully complete are described in the Proficiency Sheets in the appendix of this Handbook. The proficiency sheets, evaluation form, and time sheets are distributed to students prior to clinical training.

ADDITIONAL CLINICAL EDUCATION GUIDELINES AND REQUIREMENTS

Professional Liability Insurance

All students are required to have Professional Liability Insurance through; Allied Health Professional Liability, MERCER www.proliability.com , 1-800-503-9230

Students are required to show proof of appropriate professional liability insurance coverage prior to registration for Clinical Rotations.

Medical Clearance

All students are required to be medically cleared prior to the start of clinical rotations. Medical records and site appropriate forms are to be submitted to the Director and Clinical Coordinator in a pdf file via email. NO student will begin clinical rotations without medical clears and receipt of all necessary forms

The medical clearance process includes but is not limited to the following;

- a physical and a declaration by your physician, or CUNY CSI Health Center that you are in good physical health and able to begin clinical rotations.
- A record of all immunizations including Mumps, Measles, Rubella and serologic tests reflecting appropriate titers.
- A record of your Hepatitis vaccinations
- A recent (within 3 months) PPD check for tuberculosis. If there is a positive PPD, there must be an X-ray report to go along with it.
- 10 or 11 panel urine drug toxicology

Reminder; Each clinical training site has specific forms to be completed and may require additional testing. These will be presented to you upon interview with the clinical education training liaison.

Background Check

While most health care facilities with whom the Medical Laboratory Science Program has affiliation contracts will accept the school's verification that a background check has been performed on a student, some may require a more current, independent report.

The cost of any additional screening is the responsibility of the student.

ASSESSMENT AND EVALUATION OF STUDENTS at CSI and in the CLINICAL EDUCATION SETTING

Each MLS course presented in the Medical Laboratory Science Program will be evaluated for grading using the following criteria, where appropriate:

- Written examinations which include problem solving
- Laboratory presentation or demonstration to the class of exercise and techniques
- Case studies
- Colored slides, power point, and audio-visual examinations
- End of course evaluation to determine affective behavior in the Didactic/Student Laboratory Setting.

Course completion for Clinical Education involves:

- Proficiency testing of learning objectives outlined in MLS program handbook in each rotation
- Written examinations
- End of rotation evaluation to determine affective behavior in the Clinical Education Setting

Course Evaluations

At the end of each course, students are given time in class to complete an online course evaluation for the purpose of providing personal assessment of the courses and instructors. These evaluations are sent out by and returned to the College's Administrative offices. These evaluations assist faculty in self-improvement of the course offered in the program.

Clinical Site Evaluations

All student evaluation forms are reviewed, statistics compiled and data presented for use in determining instructor effectiveness, difficulty of the class, and separate comments for self expression. The data is submitted to the department for use in reports for our program's accreditation and improvement.

In addition to student evaluations, we ask all faculty, both University based and at the Clinical sites, for evaluations of the courses and special needs they would like addressed. The Medical Technology Advisory Committee meets annually to address these issues.

Clinical Proficiencies

In order to assure a high quality and equitable educational experience in multiple disciplines at multiple clinical sites, a set of standardized proficiencies has been developed that requires all of the

students in the clinical laboratory education portion of their training to complete, regardless of training site.

These proficiencies have been written for the performance of specific laboratory assays that are equipment and methodology neutral to allow for the variation between clinical sites. Clinical Proficiencies are graded and used to assign a course grade. These proficiencies must be completed prior to the completion clinical training. Students must pass according to the grading policy listed for each test performed. A minimum of 80% is usually required. Should a student score lower than 80%, student may re take the proficiency once. If student scores lower than 80% after the second time, student will be placed on probation, and remediated as decided upon by Clinical Liaison, Program Director and Clinical Coordinator. Once remediated, if the student fails the third time, he/she may face dismissal from the program.

Affective Evaluation

A written evaluation assessing the student's affective areas of performance in the classroom, student lab and during the clinical rotation. The purpose of this evaluations is to provide the student with an overall assessment of their behavioral performance in the classroom or particular rotation. It also will assess student's progress towards acquiring readiness to function as an entry-level laboratory professional. A minimum grade of 80% is required to pass the evaluation. If a student receives less than an 80% on their evaluation, the student is placed on probation, counseled, a remediation action plan created.

Employer Evaluation

A written evaluation of how our graduate(s) are performing as employees in an organization. The former graduate gives signed a consent giving the CUNY CSI Medical Technology Program permission to send this survey. Survey results are used to help program officials assess the quality of training and preparation received by our graduates.

GRADING CRITERIA**Didactic and Clinical Courses**

The Medical Technology Program requires a GPA of 3.0 (on a 4.0 scale) for MLS courses be maintained in order to remain in the Program. An unsatisfactory performance during clinical rotations may necessitate removal from the clinical site. For students whose GPA falls below 3.0, during the first semester, a warning letter shall be sent to the student. If the student fails to improve GPA by the second semester, he/she shall be placed on academic probation. Refer to retention/progression policy.

GRADING POLICY

90-100%	A
88-89%	A-
85-87%	B+
80-84%	B
78-79%	B-
75-77%	C+
70-74%	C
60-69%	D
Below 69%	F

A grade of C or better is required in any pre-major and major course.

ACADEMIC INTEGRITY

A grade of F will be assigned to any student confirmed of academic dishonesty. The academic integrity policy can be found in every MLS course syllabus.

SERVICE WORK

The policy of the Medical Laboratory Science Program regarding service work is that students will not be substituted for regular staff while on the clinical rotation. Students are prohibited from performing service work, or substituting for (compensated or uncompensated) any regular, qualified, staff employee at the clinical education site during the hours of student clinical rotations (8:00 AM– 5:00 PM). Any duties performed by the student at the clinical site is under strict supervision of a qualified technologist of the site and the technologist is responsible for final verification of the data and its release to the laboratory operating system (LIS). Student participation in off hour activities is not compulsory and voluntary. These activities may include blood drives, job fairs, and conferences. Students are under continuous supervision during off hour activities.

TEACH-OUT PLAN

Under the circumstances where the College of Staten Island Medical Laboratory Science program is discontinued, the program has developed a teach-out plan with another college in the City University of New York system. This plan with York College would allow the CSI students to complete their undergraduate studies in their Clinical Laboratory Science program.

PROFESSIONAL ORGANIZATIONS

Students are strongly encouraged to join professional organizations and societies. As student members of the various professional organizations, they may be eligible for scholarships and discounts for seminars and publications. We encourage our students to become active in the professional organizations. It is an excellent way to meet peers, and also keeping up with continuing education.

The College of Staten Island Medical Laboratory Science program is proud to be accredited by NAACLS since October 2012, and registered with the New York State Education Department for Clinical Laboratory Science.

National Accrediting Agency for Clinical Laboratory Science (NAACLS)

8410 West Bryn Mawr Avenue, Suite 670 Chicago, Illinois 60631
E-mail: <http://naaccls.org>
(773) 714-8880

American Society for Clinical Pathology (ASCP)

Board of Registry Department #77-3335
Chicago, Illinois 60678-3335
Email: www.ascp.org
(312) 738-1336
STUDENTS JOIN ASCP FREE!

New York State Education Department Office of the Professions (NYSED OP)

PO Box 22063
Albany, NY 12201
www.op.nysed.gov

American Society for Clinical Laboratory Science (ASCLS)

7910 Woodmont Avenue Suite 1301
Bethesda, Maryland 20814
(301) 657-2768
Email: www.ascls.org

STUDENT CONTACT INFORMATION

It is the responsibility of the student to inform the Program Director of any changes in address, phone number and/ or email address within one business week of the change. The student should also contact the Biology office at 718-982-3850 with these changes.



2800 Victory Boulevard
Staten Island, NY 10314
T 718.982.3850 • F 718.982.3852
www.csi.cuny.edu

**Medical Laboratory Science Program
Department of Biology**

ACKNOWLEDGEMENT OF RECEIPT to TERMS OF HANDBOOK

I have received my copy of the CUNY CSI Medical Laboratory Science Program Handbook. I understand that it is my responsibility to read and familiarize myself with the policies and procedures presented in this handbook.

I further agree to abide by the CUNY CSI and MLS program policies and accept full responsibility for my behavior.

I pledge to adopt the professional code of conduct as set forth by ASCLS and the College, to perform my duties to the best of my ability and, upon graduation, will strive to demonstrate pride in my career as a professional.

Signed: _____ **Date:** _____

Print Name: _____



2800 Victory Boulevard
Staten Island, NY 10314
T 718.982.3850 • F 718.982.3852
www.csi.cuny.edu

Medical Laboratory Science Program

Acknowledgement of Clinical Education Responsibilities

I have completed all required didactic courses in the Medical Laboratory Science program and have applied for clinical training at sites affiliated with the College of Staten Island.

I understand that the clinical training schedule, including holiday schedule and sick days, follow that of the training hospital.

I understand that if more than 3 days of the training time is missed (including absences due to family or personal reasons) by a student for a designated rotation area, it is the clinical supervisor's discretion to decide whether the student is allowed to make up for the missing time. If make up time is not permitted, the student will be required to repeat the entire rotation for the designated area. There is no guarantee that an immediate rotation can be provided.

I understand that if I get dismissed by the training hospital due to disciplinary issues, I may be dismissed from the CSI Medical Laboratory Science program.

Signed: _____ **Date:** _____

Print Name: _____