

**Master of Science in
Medical Laboratory Science
(Non-Thesis) Program Policy
Statement**

Presented to the Faculty Senate
University of Delaware Newark, DE 19716
By Esther E. Biswas-Fiss, Ph.D., MB(ASCP) Professor and
Chair
Department of Medical and Molecular Sciences

October 27, 2018

Revised February 19, 2020

Revised February 15, 2022

Table of Contents

	Page
Part I. Program History	
A. Statement of purpose and expectation of graduate study in the program	3
B. Current status	5
C. Degrees offered... ..	5
Part II. Admission	
A. Admission requirements and University policy statement on admission.....	5
B. Prior degree requirements	5
C. Application deadlines	8
D. Special requirements – immunizations	8
Part III. Diversity, Equity and Inclusion.....	9
Part IV. Academic	
A. Degree Requirements	
1. Course requirements.....	10-12
2. Non-registered requirements.....	12
3. Policies for variance in degree requirements	12
B. Committees for exams, thesis, or dissertations N/A (non-thesis)	
C. Timetable and definition of satisfactory progress towards the degree	
1. Academic load and normal progress	13
2. Forms Required.....	13
3. Grade Requirements.....	13-14
4. Identify consequence for failure to make satisfactory progress	14
Part V. Assessment Plan	
A. Direct.....	14
B. Indirect	15
Part VI. Financial aid	
A. Financial awards statement	15
Part VII. Departmental Operations	
A. Overview and governance.....	15-16
B. General student responsibilities	17
C. Student government and organizations (both student and professional)	17
D. Travel for professional meetings or presentation.....	17

This proposal was approved for a non-thesis MS in Medical Laboratory Science (MLS). This degree is offered through the Department of Medical and Molecular Sciences.

I. Program History and Description

A. Statement of purpose and expectation of graduate study in the program The MS in MLS for science graduates program is a 61-credit blended (having both online, hybrid and face-to-face instruction) master's degree for individuals holding a **Bachelor of Science in biology, chemistry, or a related major and who are not certified medical technologists or medical laboratory scientists** but who desire a career in the clinical laboratory sciences. Upon completion, these individuals are eligible to take a national examination for certification as a medical laboratory scientist. Through this degree, students gain specialized, in-depth professional hands-on skills and leadership competencies preparing them to succeed within the clinical laboratory sciences sector. The MS in MLS allows students to gain defined "bench-focused" technical competency, in addition to training in regulatory and fiscal affairs that impact laboratory management. Completion of this program, accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS), prepares students to perform clinical laboratory testing and to complete the ASCP Board of Certification national certification examination in Medical Laboratory Science, MLS(ASCP). Following graduation, students can apply their knowledge to meet specific career goals in clinical laboratory practice or, with experience, in management.

Benefits of pursuing the MS in MLS include:

- Gaining a workforce ready, well-rounded and marketable set of technical skills geared for future employment
- Exposure to regulatory, fiscal and management aspects of laboratory practice
- Rapid and fixed time frame of degree completion (18 months)
- Internships integrated into the curriculum offer a leg up in the job market upon graduation
- Preparation to sit for the medical laboratory scientist board of certification exam

offered through the American Society for Clinical Pathology/BOC.

Overarching goals of this program are to provide a highly-skilled cadre of leaders in the laboratory-based professions. The new program aligns with the vision of the University of Delaware as a center for graduate level professional education and training.

Outcomes for the MS in MLS include the expectation that students will be able to:

- Apply the advanced knowledge and technical skills needed to serve as active contributors and/or leaders in the laboratory science profession;
- Critically review, appraise and synthesize the biomedical sciences literature;
- Identify and systematically investigate research questions pertinent to laboratory practice;
- Synthesize new concepts, models and theories through the appropriate application of empirical knowledge and the scientific method to help resolve clinical laboratory and health sciences issues or problems;
- Apply current knowledge to evaluate or design more effective ways to deliver clinical laboratory and health-related services;
- Use a variety of information technologies to address both theoretical and practical problems, enhance communication, and disseminate knowledge to applicable audiences and interest groups;
- Demonstrate proficiency in both oral and written communication, using both scholarly and technical formats;
- Work collaboratively with others to advance the scientific bases of knowledge in laboratory science via ongoing scholarship;
- Integrate basic principles of ethics and cultural sensitivity within all interpersonal and professional activities.

The proposed new program is compatible with the academic priorities of the University by supporting the initiative of creating a diverse and stimulating graduate academic environment. This new initiative aligns with the UD Path to Prominence *One Health Initiative* where the University desires to expand its graduate level health and medical education programs.

B. Current Status

This proposal was approved for a non-thesis MS degree in Medical Laboratory Science and launched in Spring of 2020.

C. Degrees Offered

MS degree in Medical Laboratory Science

II. Admission

Admission to the graduate program is competitive. Those who meet stated minimum requirements are not guaranteed admission, nor are those who fail to meet all of those requirements necessarily precluded from admission if they offer appropriate strengths.

The MS in Medical Laboratory Science program is not intended for those who are already certified medical technologists or medical laboratory scientists or who have completed a bachelor's degree in MLS. Such individuals should consider enrolling in the MS in Medical Sciences offered through the Department of Medical and Molecular Sciences, which is intended for those who have already completed a BS degree in a clinical laboratory-based discipline. Questions regarding which MS degree program is appropriate should be directed to the Program Director for the MS in MLS.

Admission Requirements

Expected Minimum Requirements for Admission into the MS in Medical Laboratory Science - Admissions decisions are made by the Department of Medical and Molecular Sciences' Graduate Program Committee. Students will be admitted to the program based on enrollment availability and their ability to meet the following minimum recommended entrance requirements:

- Successful completion of a Bachelor's degree, from an accredited academic institution, in a science-based discipline, including, but not limited to: Biology, Chemistry, Biochemistry, Nutrition or Exercise Science.
- Students not having completed a BS in a science-based discipline may be considered for admission provided they have completed the following science and math prerequisite course work: 16 credits of Biological Sciences including one

semester of Microbiology; 12 credits of chemistry including one semester of organic chemistry; 3 credits of immunology required including a laboratory component; and 3 credits of college level math or statistics.

- Application is competitive and a minimum cumulative GPA of 3.0 is recommended.
- The GRE is not required.
- Completion of the TOEFL requirements are described in detail below for international applicants
- Written statement of goals and objectives (the personal statement) that clearly identifies the applicant's research and curriculum interests and explains how admission to the program will facilitate their professional objectives.
- Current résumé and two academic or professional letters of recommendation.

All students will be expected to be sufficiently conversant in English and knowledgeable in the written word to convey clear, logical and complex written expressions.

Specific Admission Procedures - Applicants must submit all of the following items directly to the University Graduate College using the online admission process before admission can be considered. Admission applications are available at: <https://grad-admission.udel.edu/apply/>:

1. A nonrefundable application fee must be submitted with the application. Credit card payment is accepted with the online application. Checks must be payable to the University of Delaware. Applications received without the application fee will not be processed. International students paying by check must use a check drawn on a US bank or an International Postal Money Order.
2. Applicants must submit responses to specific questions asked on the application; a resume; and a statement of professional goals and objectives.
3. Applicants must submit at least two letters of recommendation. All letters of recommendation should be mailed directly to the Graduate College.
4. One official transcript of all US colleges and universities attended must be sent directly

from the institution to the Graduate College or be provided in a sealed envelope with the application packet. Students who have attended the University of Delaware need not supply a transcript from Delaware.

5. One official transcript of all non-US based college and university records is required. The transcript must list all classes taken and grades earned. If the transcript does not state that the degree has been awarded, send a degree certificate that states that the degree has been awarded. If the degree has not been awarded or the degree certificate has not been issued, evidence of the awarded degree must be provided prior to the first day of classes in the term of admission. For institutions that issue documents only in English, send the English original. For institutions that issue documents both in English and a foreign language, send both the English language original and the foreign language original. For institutions that issue documents only in a foreign language, send the foreign language original and a certified translation in English. The translation must be certified by an official of the issuing institution, a state- or court-appointed translator, or the Embassy of the issuing country in the United States.

If it is necessary to send non-original documents: a. The documents must be original “attested copies”, officially attested to by the issuing institution or the Embassy of the using country in the United States, and b. Certified translations must be originals, no copies will be accepted.

6. International student applicants must demonstrate a satisfactory level of proficiency in the English language if English is not the first language. The Test of English as a Foreign Language (TOEFL) is offered by the ETS in test centers throughout the world. The University requires an official paper-based TOEFL score of at least 550 or at least 79 on the Internet-based TOEFL for an applicant to be considered for admission. TOEFL scores more than two years old cannot be validated or considered official.

7. International students must be offered admission to the University and provide evidence of adequate financial resources before a student visa will be issued. The University has been authorized under federal law to enroll non-immigrant alien students. International students are required to purchase the University-sponsored insurance plan or its equivalent.

9. All first-time international students are required to attend the Orientation Day for new international students, which takes place before classes begin.

10. It is a Delaware State Board of Health regulation and a University of Delaware mandate that all graduate students with a birth date after January 1, 1957, be immunized for measles, mumps and rubella (MMR). Also, students may be required to provide evidence of PPD (Mantoux) Tuberculosis Screening Test within 6 months prior to beginning classes. Students who are admitted beginning January 2002 are required to show proof of vaccination against meningococcal disease unless granted a waiver. Students should refer to and complete the Student Health Service Immunization Documentation form upon admission.

Admission Application Processing - Applications will be processed as they are submitted. The admission process is completed as follows: First, completed applications consisting of the application form, academic transcripts, letters of recommendations, resume, and written statement of goals and objectives are reviewed by the Medical and Molecular Sciences' Graduate Program Committee. The Program Committee arrives at an admission decision after reviewing the completed application. Students are notified in writing of the admissions decision within two weeks of the decision. It should be noted, admission to the MS in Medical Laboratory Science does not confer admission to the Ph.D. in Medical Sciences, which is a distinct graduate program offered through the College of Health Sciences.

Application Deadlines

Applications will be taken on a rolling basis to allow for admittance in the Spring semester (only). Note: International applicant deadlines precede Domestic, US citizen applicants, due to additional timing requirements for obtaining an appropriate student VISA.

December 15 (International applicants)

January 15 (Domestic applicants, US citizens)

III. Diversity, Equity and Inclusion

The Department of Medical and Molecular Sciences embraces and upholds the University of Delaware's Diversity initiatives as outlined below and on the UD website at:
<https://sites.udel.edu/diversity/>

As prepared by the Diversity and Equity Commission and The President's Diversity Initiative

The University of Delaware's educational mission is to prepare students to live in an increasingly interconnected and diverse world. To do so, we are committed to fostering a robust educational environment that supports critical thinking, free inquiry, and an understanding of diverse views and values. We see diversity as a core value and guiding principle for our educational mission and thus must work to make diversity an integral part of everyday life on campus. To this end, we take diversity to mean both the recognition and appreciation of the different backgrounds, values, and ideas of those who comprise our campus, as well as a commitment to ensuring that all people on our campus are treated according to principles of fairness, civility, dignity, and equity. We are committed to building an educational community that understands people from different backgrounds and economic circumstances, with different needs, and from diverse personal and philosophical beliefs. We want to make all people who are part of the University feel welcome and valued in campus life.

In the College of Health Sciences and the Department of Medical and Molecular Sciences, we *commit* to:

1. Exhibit appropriate professional conduct and represent our prospective professions effectively.
2. Uphold a culture that is inclusive, where all students, faculty, and staff feel welcome and free from discrimination.
3. Interact respectfully with **all** students, faculty, and staff within the University and individuals in the community.
4. Interact respectfully with **all** students, faculty, staff, and individuals in the online environment (i.e., email, social media), including avoiding the use of racist, sexist, or other discriminatory remarks.
5. Report experienced or observed discrimination or harassment through the appropriate channels (e.g., UD Discrimination/Harassment Reporting Form).
6. Engage in courageous conversations and activities that empower students, faculty and staff to stand up against injustice and discrimination.
7. Strive to develop as students who become leaders, scholars, and health professionals who promote health for **all** individuals and help dismantle barriers to the best possible quality of care for **all**.
8. Promote well-being, balance, and resilience for **all** students, faculty, and staff, through diverse tools, resources, and offerings to allow everyone to thrive.
9. Provide the highest quality of clinical care, that is responsive to the individual needs of our patients and their caregivers, with an understanding of the needs of patients within a larger sociocultural context (e.g., race, culture, gender, sexual orientation, religious beliefs, socioeconomic realities), both during and beyond our clinical training.

It is the expectation that students honor and abide by these principles in all aspects of their school, work, and external environment.

III. Academic

A. Degree Requirements

Table 1 - Degree Requirements	
Category	Semester Credit
Core MLS Curriculum	40
Core MS Courses	9
Other (Specify, clinical practica)	12
TOTAL	61

Medical Laboratory Science Core

Table 1 presents an overview of the sectors which make up the MS in MLS curriculum.

1. 40 crs. of subjects specific to clinical laboratory science will be completed by students without a degree in medical laboratory science as part of the curriculum. This is necessary both for the student to be sufficiently knowledgeable about the profession to practice in a clinical laboratory setting, be eligible to sit for the ASCP Board of Certification Exam and to select a Capstone Project.
2. These courses are predominately laboratory courses. Competency in the various laboratory techniques is necessary to function within the clinical science laboratory. This requires that the student be able to attend courses at the UD campus.

Additional Required Courses

Students are required to complete 9 crs. of graduate level coursework which includes courses in research design, regulatory and fiscal issues in laboratory management and completion of a capstone project.

Masters Capstone (Contemporary Topics Research MMSC 815)

The student will complete a rigorous capstone project that 1) constructs a focused investigation of a clinical laboratory science problem in real-world setting, 2) applies problem solving methodologies for development and execution of solutions, 3) investigates and applies theory through practical implementation of a project, and 4) evaluates and reports this research project in a clear, professional manner using the guidelines set forth in the course syllabus.

Clinical Practica

1. Supervised clinical practice will include: clinical chemistry, hematology, microbiology, & immunohematology as well as immunology and body fluid analysis.
2. Supervised clinical practice (preceptorship) will involve 40 hours/week for 3 weeks per specialty area specified above for a total of 480 hours.

**Table 2 – Curriculum Sequence
(MLS Core, Masters Core Courses & Clinical Practica)**

Prefix and Number	Required Courses	SCH
Spring - Semester 1		
MMSC 607/617	Clinical Physiological Chem I with lab	4
MMSC 623/624	Hematology I with lab	3
MMSC 628/629	Medical Microbiology with lab	5
MMSC 609/619	Immunoematology I with lab	3
	Total Credits	15
Summer - Semester 2		
MMSC 603	Research Design (online)	3
MMSC 691	Human Molecular Genetics	3
	Total Credits	6
Fall - Semester 3		
MMSC 636	Clinical Physiological Chem II	3
MMSC 637	Clinical Instrumentation Lab	2
MMSC 633/634	Hematology II with lab	4
MMSC 620/621	Immunoematology II with lab	3
MMSC 638/639	Diagnostic Bacteriology & Medical Mycology with lab	4
MMSC 602/612	Body Fluid Analysis with lab	2
	Total Credits	18
Spring - Semester 4		
MMSC 605	Regulatory and Fiscal Issues in Laboratory Management	3
MMSC 627	Flow Cytometry	2
MMSC 815	Contemporary Topics Research I	3

MMSC 693	Cellular & Molecular Diagnostic Techniques	2
	Total Credits	10
Summer - Semester 5		
MMSC 673	Advanced Clin. Chem/Body Fluid Analysis Practicum	3
MMSC 675	Advanced Clinical Hematology Practicum	3
MMSC 677	Advanced Clinical Microbiology Practicum	3
MMSC 679	Advanced Immunohematology Practicum	3
	Total Credits	12
	Credits For Degree	61

2. Residency Requirement. At least 5 semesters of graduate work are required for the MS degree. This residency requirement, by design for the MS degree will be fulfilled using a spring, summer, fall, spring, summer semester combination.

3. Course Substitutions. Courses in the core curriculum may not be substituted. Transfer graduate coursework cannot count towards the degree.

4. Required Background Check. Clinical practical rotation/fieldwork sites that require a criminal background check, child abuse clearance, adult abuse clearance and/or fingerprinting may deny a student's participation in the clinical experience or rotation because of a felony or misdemeanor conviction or a record of child abuse. Clinical sites may also deny participation in clinical experiences for other reasons, including but not limited to failure of a required drug test, or inability to produce an appropriate health clearance. As participation in clinical experiences is a required part of the curriculum and a requirement for graduation, denial of participation by a clinical site may result in delay of graduation or the inability to graduate from the program. Regardless of whether or not a student graduates from the University of Delaware, individuals who have been convicted of a felony or misdemeanor may be denied employment, certification or licensure as a health professional. Information regarding individual eligibility may be obtained from the appropriate credentialing bodies or health care facility.

B. Committees for exams, thesis or dissertations

N/A - the MS in MLS is a non-thesis MS degree.

C. Time Limit for Completing the Degree & Definition of Satisfactory

Academic Progress

1. Timetable. The time limit for completion of degree requirements begins with the date of matriculation and is specifically detailed in the student's letter of admission. Students entering the program are given 5 consecutive semesters, in the specific sequence outlined in the curriculum sequence (**Table 2**), to complete the program requirements. An extension of time limit may be granted for circumstances beyond the student's control. Requests for time extensions must be made in writing and approved by the MS in Medical Laboratory Science Program Director. The director will forward the request to the Graduate College.

2. Submission of Required University Forms. To initiate the process for degree conferral, candidates must submit an "Application for Advanced Degree" to the Graduate College. The application deadline is May 15 for Summer candidates. The application must be signed by the program director and department chair. There is an application fee for master's degree candidates that is published by the university. Payment is required when the application is submitted. Upon completion of the audit, the Graduate College notifies students in writing when they have met all degree requirements.

3. Grade Requirements for Satisfactory Progress. Failure to satisfactorily progress in the program will be based on the University Graduate Policy as noted below: The Graduate College monitors the academic progress of all graduate students and notifies students in writing of all academic deficiencies. The cumulative GPA after each 9-hour increment determines academic standing. The University's Academic Probation Policy is expressed in the following chart.

If a student is on:	Earns a GPA of:	The status becomes
Any status	3.0 or above	Clear
Clear	2.99-2.5	Warning
Clear	2.49-2.0	Probation
Probation	Below 3.0	Dismissal
Warning	Below 3.0	Probation
Any status	Below 2.0	Dismissal

4. Reasons for Dismissal/Termination from the Program. The Graduate College notifies students when they are dismissed from graduate programs without completing a degree. Dismissals usually take place at the end of a term. Students may be dismissed for the following reasons:

- Upon the expiration of the 18 month time limit required for students to complete their degree.
- Upon the failure to meet the grade point average requirements as stated in the policy on Academic Deficiency and Probation.
- University of Delaware policies for appeal of dismissal can be found at <https://grad.udel.edu/policies/graduate-academic-policies/>

IV. Assessment Plan and Program Evaluation

Faculty who will be affiliated with the program worked with the UD Center for Educational Effectiveness to fully develop the program’s assessment plan. This work entailed the development of a curriculum map to align selected courses with the intended learning outcomes of the program.

Direct Measures. Four Learning Outcomes have been identified for the program. Upon completion of the program, all students will:

1. Employ research methods to assess a problem in the field of medical science in an ethical manner. Course Assessed: MMSC 603 *Research Design*

2. Communicate research findings in an effective manner. Course Assessed: MMSC815
Contemporary Topics Research
3. Demonstrate the ability to quantitatively analyze data using several different statistical procedures. Courses Assessed: MMSC 603 *Research Design* and MMSC 815
Contemporary Topics Research
4. Evaluate and assess regulatory and fiscal situations encountered in laboratory settings and make best-practice, evidence-based recommendations. Course Assessed: MMSC 605
Regulatory and Fiscal Issues in Laboratory Practice

Indirect Measures.

Alumni Surveys: One-Year and Five-Year Post-Graduation Surveys of graduates will be conducted one-year and five-years post-graduation. The surveys will focus on two major areas: program/education effectiveness and demographic information pertaining to employment status and/or graduate/professional school enrollment.

Field Experience Supervisor Surveys

Upon completion of the field experience(s), the field experience supervisor will complete a rubric designed to assess the affective & technical skills demonstrated by the student.

V. Financial Aid

This is a tuition generating graduate program and tuition remission and/or stipends are not offered. Graduate students in this program would be eligible to apply for financial aid as applicable.

VI. Departmental Operations

This program started in the spring of 2020. We initially anticipate approximately 5-10 students following this course of study each year. Within the Department of Medical & Molecular Sciences, a core of faculty currently exist with expertise in medical laboratory science and the graduate core curriculum to deliver this program. These faculty will have primary teaching responsibility for the delivery of this program (**Table 3**).

Table 3 - Current Faculty Affiliated with the Program

Name	Degree	Rank	Specialty
Charles Buz Swanik	Ph.D.	Professor & Deputy Dean	Administration
Esther Biswas-Fiss	Ph.D.	Professor & Chair	Molecular Diagnostics, Biotechnology
Leslie Allshouse	M.Ed., M.B.A.	Senior Instructor	Immunohematology, Ethics
Mona Batish	Ph.D.	Assistant Professor	Applied Molecular Biology
Subhasis Biswas	Ph.D.	Professor	Applied Molecular Biology, Clinical Chemistry
Andrew Hollinger	M.S.	Instructor	Molecular Diagnostics, Medical Microbiology, Regulatory Affairs
Virginia Hughes	Ph.D.	Associate Professor	Hematology, Public Policy, Research Design
Huey-Jen Lin	Ph.D.	Associate Professor	Molecular Diagnostics
Paula Melancon	M.Ed.	Instructor	Hematology, Immunohematology
Vijay Parashar	Ph.D.	Assistant Professor	Applied Molecular Biology
Kimberly Walker	Ph.D.	Assistant Professor	Medical Microbiology, Public Policy, Regulatory Affairs
Heather Walters	M.Ed.	Instructor	Medical Microbiology

Graduate Coordinator. The MMS department chair will appoint a graduate coordinator for the Medical Laboratory Science Master’s Program from among the department faculty. The term of service for the graduate coordinator is three years, with no limit on the number of consecutive terms that may be served. The graduate coordinator serves as the program representative and point person and is responsible for the following:

- Corresponding with prospective students
- Maintaining program records
- Holding elections for members of the Program Committee
- Chairing Program Committee meetings
- Admitting students to the program following approval of the Program Committee Chairing meetings of the MS-MLS faculty as necessary for review/revision of program policies and curriculum
- Final approval of degree granting

Program Committee. The Medical and Molecular Sciences Graduate Program Committee will consist of affiliated faculty members from the department, serving in staggered, three- year terms. The graduate program coordinator will serve as chair of the Program Committee. Responsibilities of the Program Committee shall include:

- Admission of students into the program
- Approval of changes to the graduate curriculum
- Oversight of student progress in the program, including dismissal of students who fail to make satisfactory progress

MS in MLS Students

- A. **Student Organization.** Students in the program will be encouraged to periodically meet as a group so that the student representative can pass on any pertinent information from program meetings and so the group can discuss any issues or concerns they might have. Concerns can be brought to the attention of the program faculty by the elected student representative.
- B. **Laboratory Safety and Research Regulations and Standards of Student Conduct.** Graduate students performing laboratory diagnostic testing and/or research are subject to all University regulations regarding safety, human subjects, animal use, and hazardous and radioactive material use and disposal. These guidelines may be found in the University of Delaware Policies and Procedures Manual. Additional information can be obtained from the UD Research and Graduate Studies website:
<http://www.udel.edu/research/>
- C. **Travel.** Students will be encouraged to attend regional scientific meetings and symposia. Funding will be sought from available University/College/departmental funds should a student attend a conference for the purpose of presenting a peer- reviewed poster or to play a leadership role in the conference.