

## 3+2 IIT BS Biology - RUSH University MS in Medical Laboratory Science

### [Medical Laboratory Science](#)

This 'back-transfer' program between IIT BS in Biological Science and RUSH MS in Medical Laboratory Science was approved by the Biology department by a unanimous vote on 11/13/2024.

#### Prerequisites

Applications are ranked on the basis of grades in prerequisite courses, references, interview results and the written essay (if applicable). The following prerequisites are required for admission:

- A Bachelor of Science degree from an accredited United States college or university documented with official transcripts from each college or university attended. The program will accept a BS/BA degree from a foreign institution for admission with the following stipulations:
  - The foreign transcript must be evaluated by the Educational Credentials Evaluators (ECE) or World Education Services (WES), and the evaluation must result in a determination that the student has earned a BS/BA that is equivalent to a U.S. BS/BA
  - The applicant must satisfy the College of Health Sciences' policy for the TOEFL exam
- The following courses are required: 21 quarter/14 semester hours of chemistry (quantitative analysis or biochemistry recommended); 18 quarter/12 semester hours of biology (anatomy and physiology, microbiology and genetics recommended); and 4 quarter/3 semester hours of mathematics (algebra and statistics recommended).
  - An overall GPA of 3.0 on a 4.0 scale
  - Personal interview
  - Three letters of recommendation
  - TOEFL/TSE if English is not the applicant's first language

**Table I: Prerequisite courses for the MS-MLS**

Requirement	Biology Degree Program Requirements
14 hours Chemistry	CHEM124(4), 125(4), 237(4), 239(3)
12 hours Biology	BIOL107(3), 109(1), 115(3), 117(1), 214(3), 210(3)
3 hours Math	MATH425(3)

## Curriculum

1st Year Fall Semester: (16 SH)

MLS 504 Clinical Chemistry I (4 SH)

MLS 514 Hematology I (6 SH)

MLS 523 Clinical Immunology (3 SH)

MLS 526 Molecular Techniques (3 SH)

IPE 502 Interprofessional Patient Centered Teams

1st Year Spring Semester: (15 SH)

MLS 505 Clinical Chemistry II (3 SH)

MLS 524 Immunohematology (4 SH)

MLS 534 Clinical Microbiology I (6 SH)

MLS 541 Research in MLS I (2 SH)

IPE 502 Interprofessional Patient Centered Teams

1st Year Summer Semester: (16 SH)

MLS 515 Hematology II (3 SH)

MLS 535 Clinical Microbiology II (3 SH)

MLS 542 Research in MLS II (6 SH)

CHS 620 Health Care in America\* (2 SH)

CHS 605 Biomedical Ethics\* (2 SH)

2nd year Fall Semester (14 - 15 SH)

MLS 589 Clinical Laboratory Management (2 SH)

CLM 502 Quality Systems & Regulatory Issues \*(3 SH)

Clinical Practica\*\* (TBA) (9 – 10 SH)

2nd year Spring Semester (13 - 14 SH)

MLS 543 Research in MLS III (2 SH)

MLS 588 Comprehensive Review (2 SH)

Clinical Practica\*\* (TBA) (9 – 10 SH)

Total Semester Hours = 75

Clinical Practica\*\*

MLS 580P Clinical Practicum-Chemistry (3 SH)

MLS 581P Clinical Practicum-Hematology (3 SH)

MLS 584P Clinical Practicum-Immunohematology (3 SH)

MLS 585P Clinical Practicum-Education (3 SH)

MLS 586P Patient Care Techniques (1 SH)

MLS 587P Clinical Practicum – Microbiology (6 SH)

\*Courses offered online

\*\*Clinical Practica schedule will be determined by Program Administration

**Table II: Transfer Courses**

IIT Course (26)	RUSH Replacement (27)
Biology Elective (6)	MLS514 (6)
Biology Elective (3)	MLS523 (3)
Biology Elective (3)	MLS526 (3)
Free Elective (3)	MLS505 (3)
Biology Labs (6)	MLS534 (6)
BIOL451 (2)	MLS541 (2)
Free Elective (3)	MLS504 (4)

RUSH courses completed in the first year of the MS program will transfer to IIT to complete the BS in Biology according to the above course equivalencies.

### Course Descriptions

## **MLS - 504 Clinical Chemistry I**

---

This course is designed to introduce students to Clinical Chemistry as used in Medical Laboratory Science (MLS). The biochemistry, clinical utility and analysis of amino acids, proteins, carbohydrates, lipids/lipoproteins, bilirubin and non-protein nitrogen-containing molecules will be presented. Renal physiology along with the chemical and cellular analysis of urine will also be presented. Course content includes correlation of data and case studies for selected disease states. Offered: fall. Retake Counts for Credit: No. Pass/No Pass Grading Allowed: No. Credit(s): 4

---

## **MLS - 514 Hematology I**

---

This course introduces hematologic concepts and clinical applications. Students will learn about venipuncture, complete blood counts, hematopoiesis, erythrocyte metabolism, the synthesis and function of hemoglobin, leukopoiesis and differentiation of leukocytes. After students learn about the normal aspects of hematology, they will learn about the abnormalities associated with erythrocytes and leukocytes such as, anemias, hemoglobinopathies, thalassemias and leukemias and lymphomas. Case studies will be used to further students' understanding of erythrocytes and leukocytes. Laboratory sessions included. Offered: fall. Retake Counts for Credit: No. Pass/No Pass Grading Allowed: No. Credit(s): 6

## **MLS - 523 Clinical Immunology**

---

An introduction to the basic concepts and terminology of immunity is covered in this course, including development, structure and function of the lymphoid system; the basis of antigenicity; antibody structure, production and function; mechanisms of cellular and humoral immunity; the complement system; and mechanisms of immune suppression and tolerance. Topics also include the immune response and the laboratory testing related to measuring the immune response. The pathogenesis and laboratory diagnosis of immunological disorders such as hypersensitivities, immune deficiencies and autoimmunity will be discussed. Solving case studies involving immune system disorders will be an important aspect of learning about these diseases. Offered: fall. Retake Counts for Credit: No. Pass/No Pass Grading Allowed: No. Credit(s): 3

---

## **MLS - 526 Molecular Techniques**

---

This course consists of an introduction to the principles, methodologies and applications of molecular biological procedures used in the clinical laboratories. Emphasis is placed on the molecular biological procedures used in the identification of infectious agents that cause human disease, in the diagnosis of inherited diseases, in the diagnosis of cancer and in the determination of risk factors for the development of cancer. Offered: fall. Retake Counts for Credit: No. Pass/No Pass Grading Allowed: No. Credit(s): 3

---

## **MLS - 505 Clinical Chemistry II**

---

This course continues with the biochemistry, analysis and application of clinically significant chemical substances. Topics include enzyme kinetics and clinical application of enzyme levels, endocrinology, bone and mineral metabolism, cardiac markers, tumor markers, body water balance, electrolytes, pH and blood gases and testing for drugs of abuse and toxic alcohols. Course content includes the discussion of case reports and primary literature for selected disease states. Offered: spring. Retake Counts for Credit: No. Pass/No Pass Grading Allowed: No. Credit(s): 3

---

## **MLS - 534 Clinical Microbiology I**

---

This course focuses on the diagnostic procedures employed in the clinical bacteriology laboratory, such as specimen collection and the cultivation, isolation and identification of medically important bacteria. Mechanisms of antimicrobial activity and antibiotic susceptibility testing are discussed in depth. Laboratory activities familiarize the student with the appearance and colony morphology of clinically important bacteria and consist of learning procedures used in the identification of bacterial isolates, including the gram stain and various biochemical and molecular assays. These activities are then applied to the identification of unknown bacterial isolates found in patient specimens. Offered: spring. Retake Counts for Credit: No. Pass/No Pass Grading Allowed: No. Credit(s): 6

---

## **MLS - 541 Research in MLS I**

---

This is the first course in the MLS research series that is taken concurrently with Research Methods. In this course, students will apply research methods to the medical laboratory science scope of practice. Students will learn about the requirements for completing a research project in medical laboratory science that will satisfy graduation requirements, including the components of the written research paper and content of the proposal and final defense presentations. Students will attend and evaluate the research defense presentations given by students who are preparing for graduation. At the conclusion of this course, students will have selected a research topic and research mentor. Offered: spring. Retake Counts for Credit: No. Pass/No Pass Grading Allowed: No. Credit(s): 2

---

