TECHNO INDIA UNIVERSITY, WEST BENGAL

EM 4, Sector 5, Salt Lake, Kolkata-700091

SCHOOL OF ALLIED HEALTH SCIENCES
Department of Medical Laboratory Science

BACHELOR OF MEDICAL LABORATORY SCIENCE

4-YEAR UNDERGRADUATE PROGRAMME
(w.e.f. Academic Year 2026-2027)

Based on
National Commission for Allied and Healthcare Profession (NCAHP, 2021)

CURRICULUM OUTLINE

BMLS FIRST SEMESTER

COURSE NAME	Lecture	Tutorial	Practical	Credits	Contact Hours
Human Anatomy	3	1	0	4	60
Human Physiology	3	1	0	4	60
Fundamentals of the Healthcare System and Medical Laboratory Science (MLS) #	2	0	0	2	30
Communication and Professionalism#	2	0	0	2	30
Basic Emergency care and First aid	1	1	0	2	30
Basics of Computer Application	1	0	1	2	45
Human Anatomy practical	0	0	4	2	60
Human Physiology practical	0	0	4	2	60
Total	**12**	**3**	**9**	**20**	**375**

BMLS SECOND SEMESTER

COURSE NAME	Lecture	Tutorial	Practical	Credits	Contact Hours
Fundamentals of Microbiology	4	0	0	4	60
Basics of Biochemistry	4	0	0	4	60
Fundamentals of Haematology	4	0	0	4	60
Preventive and Social Medicine	2	0	0	2	30
Fundamentals of Microbiology Practical	0	0	4	2	60
Basics of Biochemistry Practical	0	0	4	2	60
Fundamentals of Haematology Practical	0	0	4	2	60
Total	**14**	**0**	**12**	**20**	**390**

BMLS THIRD SEMESTER

COURSE NAME	Lecture	Tutorial	Practical	Credits	Contact Hours
Bacteriology	4	0	0	4	60
Intermediary Metabolism and Endocrinology	4	0	0	4	60
Clinical Haematology	4	0	0	4	60
Basics of Pharmacology	2	0	0	2	30
Bacteriology Practical	0	0	4	2	60
Intermediary Metabolism and Endocrinology Practical	0	0	4	2	60
Clinical Haematology- Practical	0	0	4	2	60
Total	**14**	**0**	**12**	**20**	**390**

BMLS FOURTH SEMESTER

COURSE NAME	Lecture	Tutorial	Practical	Credits	Contact Hours
Virology and Immunology	4	0	0	4	60
Genetics and Molecular Biology	4	0	0	4	60
Clinical Pathology	4	0	0	4	60
Medical Laboratory Management and Quality Control	2	0	0	2	30
Virology and Immunology Practical	0	0	4	2	60
Genetics and Molecular Biology Practical	0	0	4	2	60
Clinical Pathology Practical	0	0	4	2	60
Total	**14**	**0**	**12**	**20**	**390**

BMLS FIFTH SEMESTER

COURSE NAME	Lecture	Tutorial	Practical	Credits	Contact Hours
Mycology & Parasitology	4	0	0	4	60
Analytical Biochemistry	4	0	0	4	60
Immunohematology and Transfusion Medicine	4	0	0	4	60
Medical Law and Ethics	2	0	0	2	30
Mycology & Parasitology Practical	0	0	4	2	60
Analytical Biochemistry Practical	0	0	4	2	60
Immunohematology and Transfusion Medicine Practical	0	0	4	2	60
Total	**14**	**00**	**12**	**20**	**390**

BMLS SIXTH SEMESTER

COURSE NAME	Lecture	Tutorial	Practical	Credits	Contact Hours
Applied Pathobiology	4	0	0	4	60
Cytology and Histopathology	4	0	0	4	60
Clinical Biochemistry	4	0	0	4	60
Biostatistics and Research Methodology	2	0	0	2	30
Cytology and Histopathology Practical	0	0	4	2	60
Clinical Biochemistry Practical	0	0	4	2	60
Applied Pathobiology Practical	2	0	0	2	60
TOTAL	**16**	**0**	**8**	**20**	**390**

BMLS SEVENTH & EIGHTH SEMESTER

Course Name	Credit	Contact Hours
INTERNSHIP (clinical lab posting/research dissertation)	20+20	900+900
TOTAL	**40**	**1800**

Total credits = 160 credits
Total Contact hours = 4125
Contact hours of all semesters = (375+ 390+390+390+390+390) + (900+900)

Credit Details:

- **Lecture / Tutorial: 1 credit = 15 hours**
- **Practical: 1 credit = 30 hours**
- **Clinical Lab postings: 1 credit = 45 hours**

Credit Includes: L – Lectures, T - Tutorials, P - Practical.

LEARNING OBJECTIVES

1. ***Foundational Knowledge***
   - Understand the normal structure and function of the human body.
   - Explain the pathophysiological basis of disease and how laboratory tests aid diagnosis.
   - Apply knowledge of microbiology, hematology, biochemistry, immunology, and molecular biology to clinical scenarios.
2. ***Laboratory Skills***
   - Perform routine and specialized laboratory tests accurately in various disciplines (e.g., hematology, microbiology, clinical chemistry, histopathology).
   - Operate, calibrate, and maintain laboratory instruments and equipment.
   - Collect, handle, and process biological specimens following safety and quality standards.
3. ***Quality Assurance & Safety***
   - Implement quality control procedures to ensure accuracy and reliability of test results.
   - Adhere to biosafety and infection control guidelines in all laboratory practices.
   - Identify and troubleshoot pre-analytical, analytical, and post-analytical errors.
4. ***Critical Thinking & Problem Solving***
   - Analyze and interpret laboratory data for clinical relevance.
   - Recognize abnormal results and understand their diagnostic implications.
   - Apply logical reasoning to solve technical problems and improve procedures.
5. ***Communication & Collaboration***
   - Communicate effectively with healthcare professionals, patients, and laboratory teams.
   - Maintain clear and accurate laboratory records and reports.
   - Demonstrate professional and ethical behavior in a clinical setting.
6. ***Research & Lifelong Learning***
   - Understand the principles of scientific research and evidence-based practice.
   - Participate in small-scale research or projects related to laboratory science.
   - Stay updated with current advances in laboratory medicine and emerging technologies.

7. ***Professional Development***

- Demonstrate responsibility, initiative, and time management in professional duties.
- Understand legal and ethical issues in laboratory practice.
- Prepare for national certification or licensing exams, if applicable.

PROGRAM OUTCOMES (POs)

Upon successful completion of the BMLS program, students will be able to:

POs	Outcome
PO1	**Apply scientific knowledge** in professional healthcare practice.
PO2	**Demonstrate clinical and technical skills** to deliver quality healthcare services.
PO3	**Collaborate effectively in teams** within an interdisciplinary healthcare setting to improve societal health.
PO4	**Uphold ethical values and professionalism** within the legal framework of society.
PO5	**Communicate effectively** with healthcare teams and the community.
PO6	**Practice evidence-based medicine** to ensure high-quality professional performance.
PO7	**Engage in continuous learning** and adapt to technological advancements for professional growth.
PO8	**Exhibit entrepreneurial, leadership, and mentorship skills** for independent practice and collaborative work in healthcare.
PO9	Demonstrates an appropriate use of information and communication technology relevant to their field.
PO 10	**Takes responsibility for personal and professional development** and demonstrates an obligation to maintain competency by applying newly acquired knowledge or abilities to patient care

PROGRAM SPECIFIC OUTCOMES (PSO)

POs	Outcome
PSO-1	Proficiently perform a full range of clinical laboratory tests, develop and evaluate test systems and interpretive algorithms and should be able to work on automated machines.
PSO-2	Manage information to enable effective, timely, accurate, and cost-effective reporting of laboratory-generated information and make specimen-oriented decisions on predetermined criteria, including working knowledge of critical values.
PSO-3	Process information and ensure quality control as appropriate to routine laboratory procedures.

GRADUATE ATTRIBUTES

Upon graduation, students from this **institution** will possess the following attributes:

S. No.	Attribute	Description
1	**Knowledge and Understanding**	Apply scientific knowledge and critical thinking in their field.
2	**Communication & Professionalism**	Communicate effectively with diverse audiences in various formats.
3	**Critical Thinking**	Analyse information and solve problems logically.
4	**Inquiry and Research**	Ask questions, investigate, and pursue new knowledge.
5	**Digital Literacy**	Use digital tools and technologies effectively and responsibly.
6	**Professionalism & Ethics**	Act ethically, responsibly, and professionally.

S. No.	Attribute	Description
7	**Lifelong Learning**	Continuously seek and acquire new knowledge and skills.
8	**Leadership & Teamwork**	Lead and work effectively in diverse teams.
9	**Interdisciplinary Skills**	Work effectively across different fields of study.
10	**Social Responsibility**	Contribute positively to society and understand global issues.
11	**Multi-cultural Competence**	Work respectfully and effectively in diverse cultural settings.
12	**Competence & Capability**	Perform their professional duties effectively and skillfully.

MARKS DISTRIBUTION

BMLS FIRST SEMESTER

COURSE NAME	Continuous assessment	End Semester Examination	Total
Human Anatomy	30	70	100
Human Physiology	30	70	100
Fundamentals of the Healthcare System and Medical Laboratory Science (MLS) #	15	35	50
Communication and Professionalism#	15	35	50
Basic Emergency care and First aid	30	70	100
Basics of Computer Application	30	70	100
Human Anatomy practical	30	70	100
Human Physiology practical	30	70	100
TOTAL			**700**
# Non-University Exams			

BMLS SECOND SEMESTER

COURSE NAME	Continuous assessment	End Semester Examination	Total
Fundamentals of Microbiology	30	70	100
Basics of Biochemistry	30	70	100
Fundamentals of Haematology	30	70	100
Preventive and Social Medicine	30	70	100
Fundamentals of Microbiology Practical	30	70	100
Basics of Biochemistry Practical	30	70	100
Fundamentals of Haematology Practical	30	70	100
Total			**700**

BMLS THIRD SEMESTER

COURSE NAME	Continuous assessment	End Semester Examination	Total
Bacteriology	30	70	100
Intermediary Metabolism and Endocrinology	30	70	100
Clinical Haematology	30	70	100
Basics of Pharmacology	30	70	100
Bacteriology Practical	30	70	100
Intermediary Metabolism and Endocrinology Practical	30	70	100
Clinical Haematology- Practical	30	70	100
Total			**700**

BMLT FOURTH SEMESTER

COURSE NAME	Continuous assessment	End Semester Examination	Total
Virology and Immunology	30	70	100
Genetics and Molecular Biology	30	70	100
Clinical Pathology	30	70	100
Medical Laboratory Management and Quality Control	30	70	100
Virology and Immunology Practical	30	70	100
Genetics and Molecular Biology Practical	30	70	100
Clinical Pathology Practical	30	70	100
Total			**700**

BMLS FIFTH SEMESTER

COURSE NAME	Continuous assessment	End Semester Examination	Total
Mycology & Parasitology	30	70	100
Analytical Biochemistry	30	70	100
Immunohematology and Transfusion Medicine	30	70	100
Medical Law and Ethics	30	70	100
Mycology & Parasitology Practical	30	70	100
Analytical Biochemistry Practical	30	70	100
Immunohematology and Transfusion Medicine Practical	30	70	100
Total			**700**

BMLS SIXTH SEMESTER

COURSE NAME	Continuous assessment	End Semester Examination	Total
Applied Pathobiology	30	70	100
Cytology and Histopathology	30	70	100
Clinical Biochemistry	30	70	100
Biostatistics and Research Methodology	30	70	100
Cytology and Histopathology Practical	30	70	100
Clinical Biochemistry Practical	30	70	100
Applied Pathobiology Practical	30	70	100
TOTAL			**700**

BMLS SEVENTH & EIGHTH SEMESTER

COURSE NAME	Continuous Assessment	End Semester Examination	Total
Lab Posting/ Research Dissertation (Logbook and Viva)	90	210	300
Lab Posting/Research Dissertation (Logbook and Viva)	90	210	300
Total			**600**

Credit Distribution: Each semester would consist of a minimum of 20 credits. The credit distribution hours for Lecture, Tutorial, Practical, and Clinics are as follows:

Credit Details:

Lecture / Tutorial: 1 credit = 15 hours; Practical: 1 credit = 30 hours; Clinical/ Lab Posting: 1 credit = 45 hours

Credit Includes: L – Lectures, T- Tutorials, P- Practical

Undergraduate Program Requirements: A minimum of **160** credits is required for the BMLS

A program of 4 years duration, inclusive of a one-year internship (Lab posting /research dissertation).

Promotion Criteria to higher semesters:

The eligibility for promotion to the next academic year is subject to securing the minimum academic performance as specified below

- First to second year: a minimum of 70% of the credits at the end of the first year (includes first and second semester)
- Second to third year: a cumulative minimum of 80% of the credits at the end of the second year (includes first, second, third and fourth semester)
- Third year to Internship/group project: Students will be eligible for internship (Lab posting/ research dissertation) only after successful completion of the entire coursework, i.e. 100% credits to be accrued by the end of the third year.

The student must complete all the coursework requirements within a maximum of double the program duration. For example, in a 4-year program, all the academic coursework needs to be completed within 8 years. Failure to do so will result in exit from the program.

Weightage distribution

Item	Weightage (%)
Formative	
Class participation/presentation	5%
Assignment & quizzes	5%
Sessional exams	20%
Summative	
End-of-Semester University exam	70%
Total	100 %

- Any components/ activities that need to be evaluated as part of the internship, without reflecting them in the CGPA

Point grading system (credit value)

Letter Grade	A+	A	B	C	D	E	F/I/DT
Credit value	10	9	8	7	6	5	0

F- Fail, DT - Detained/Attendance shortage, I – Incomplete

Internals Weightage (%)	**End semester Exam Weightage (%)**
30	70

Calculation of GPA & CGPA: An example is provided

Course code	Course	Credits (a)	Grade obtained by the student	Credit value (b)	Grade Points (a x b)
BMLS 1	Course - 1	4	D	6	24
BMLS 2	Course - 2	4	B	8	32
BMLS 3	Course - 3	3	A+	10	30
BMLS 4	Course - 4	4	C	7	28
BMLS 5	Course - 5	5	A	9	45
TOTAL		**20**	**-**	**-**	**159**

1st Semester GPA = Total grade points / total credits

159/20 = **7.95**

Suppose in **the 2nd semester, GPA** = **8.35** with respective course credit 20

$$Then, 1^{st}\ Year\ CGPA = \frac{৭.95x20 + ৮.35x20}{20 + 20} = 8.15$$

Progression Criteria to Higher Semesters

Eligibility for promotion to the next academic year is based on the following minimum academic performance requirements:

- ***First Year to Second Year:***
- A student must secure a minimum of **70% of the total credits** at the end of the first year (i.e., completion of both the first and second semesters).
- ***Second Year to Third Year:***
- A student must secure a **cumulative minimum of 80% of the total credits** at the end of the second year (i.e., completion of the first to fourth semesters).

- ***Third Year to Internship/Group Project:***
- A student will be eligible to commence the **Internship (Lab posting/ Research Dissertation)** only after the **successful completion of all coursework**, i.e., **100% of the credits** must be earned by the end of the third year.

Attendance:

A candidate has to secure minimum -

1. 80% attendance in theoretical
2. 80% in Skills training (practical) for qualifying to appear for the final examination.

No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

Program Completion Timeline

- All academic coursework must be completed within a maximum of **double the program duration**.
- For example, in a **4-year program**, all requirements must be fulfilled within **8 years** from the date of admission.

Note: Failure to complete the program within the stipulated maximum duration will result in **automatic exit** from the program.

7th and 8th Semester: Internship (Lab posting/ Research dissertation):

A compulsory internship (Lab posting/ Research dissertation) of one year - equivalent to 12 months, 52 weeks, or 1800 hours - carrying 40 credits, must be completed by each student to be eligible for the award of the **Bachelor of Medical Laboratory Science (BMLS).**

If a student opts for Research dissertation, it must be of a minimum duration of 6 months.

During the internship period, students are required to adhere to the rules and regulations of the host organisation.

Upon successful completion, students will receive an Internship Certificate that includes:

A summary of activities undertaken

Details of clinical or relevant departmental postings with corresponding hours

Information on any research project completed during research dissertation

The certificate must be authenticated by the **Dean/ Head of Department (HoD)/Coordinator and the Head of the Institution (HoI).**

Note: The Bachelor's Degree will be awarded only upon successful completion of the Internship requirements.