

CURRICULUM OF BIOTECHNOLOGY

BS Biotechnology



**DEPARTMENT OF BIOMEDICAL SCIENCES AND
BIOTECHNOLOGY
KOH SAR UNIVERSITY MURREE**

BACHELOR OF BIOTECHNOLOGY (4 YEAR) (130-136 Cr Hr)

DEGREE PROGRAM STRUCTURE

Sr.No.	Categories	No. of courses	Credit Hours
1.	Compulsory Requirement (No Choice)	9	24
2.	General Courses to be chosen from other departments	6	18
3.	Discipline Specific Foundation Courses	13	39
4.	Major Courses including research project / Optional Courses	11	36
5.	Electives within the major	6	18
	Total	45	135

- Total numbers of Credit hours 135
- Duration 4 years
- Term duration 16-18 weeks
- Terms 8
- Course Load per Term 15-18 Cr hr
- Number of courses per semester 4-6

SEMESTER-WISE BREAKDOWN OF BS (BIOTECHNOLOGY) COURSES

Semester1	BS Biotechnology Course of Study as per HEC Criteria:	
BTE101:	Cell Biology (F)	3 (3,0)
CHM103:	Physical chemistry (G)	3 (3,0)
CSS101:	Introduction to Information and Communication technologies (C)/	3 (2,1)
MTH106:	Mathematics-I (C)	3 (3,0)
IST101:	Islamic Studies (C)	2 (2,0)
ENG101:	English-I (Reading and writing skills)(C)	3 (3,0)
	Total	17
Semester2		
CHM208:	Introduction to Biochemistry (F)	3 (2,1)
BTE102:	Basics of Genetics (F)	3 (3,0)
CHM201:	Inorganic chemistry(G)	3 (3,0)
ENG105:	English-II (Composition writing) (C)	3 (3,0)
GEN101:	Pakistan studies(C)	2(2,0)
MTH107:	Mathematics-II (C)	3 (3,0)
	Total	17
Semester3		
BTE201:	Introduction to Molecular Biology (F)	3 (2,1)
CHM202:	Organic Chemistry(G)	3 (3,0)
BTE202:	Biosafety & Bioethics (C)	2 (2,0)
ENG202:	English III (Communication and Presentation skills) (C)	3 (3,0)
BTE203:	Introduction to Biotechnology(F)	3 (3,0)
MIC301:	Introduction to Microbiology (F)	3 (2,1)
	Total	17
Semester4		
BTE204:	Fundamental of Molecular Biology (F)	3 (2,1)
CHM203:	Fundamental of Biochemistry(F)	3 (3,0)
BTE205:	Research Methodology in Biotechnology (M)	3 (3,0)
STA202:	Biostatistics (F)	3 (3,0)
PSY101	Introduction to Psychology (G)	3 (3,0)
	Total	15
Semester5		
BTE301:	Immunology (F)	3 (2,1)
BTE302:	Plant Physiology (G)	3 (2,1)
BTE303:	Methods in molecular Biology (F)	3 (2,1)
BTE304:	Microbial Biotechnology (F)	3 (2,1)
BTE305:	Enzymology (E)	3 (2,1)

BTE306:	Genetic resources & conservation (F)	3 (3,0)
	Total	18
Semester6		
BTE307:	Agricultural Biotechnology(M)	3(3,0)
BTE308:	Recombinant DNA Technology (M)	3(2,1)
BTE309:	Biosensors (E)	3(3,0)
BTE310:	Food Biotechnology (M)	3(2,1)
BTE311:	Animal Biotechnology (E)	3(2,1)
BIF102:	Bioinformatics I (M)	3(2,1)
	Total	18
Semester7		
BTE401:	Pharmaceutical Biotechnology (E)	3 (3,0)
BTE402:	Genomics and Proteomics (M)	3 (3,0)
BTE403:	Entrepreneurship in Biotechnology(E)	3 (2,1)
BTE404:	Environmental Biotechnology (M)	3 (3,0)
BTE405:	Principles of Biochemical Engineering (M)	3 (2,0)
PHY409:	Biophysics (G)	3 (3,0)
	Total	18
Semester8		
BTE406:	Health Biotechnology (M)	3 (3,0)
BTE407:	Industrial Biotechnology (M)	3 (2,0)
BTE408:	Nanotechnology (E)	3 (3,0)
BTE409:	Research Project/ Special Paper (M)	6 (6,0)
	Total	15
Total Semesters Credit Hours		135

LIST OF ELECTIVE COURSES AND OPTIONAL PAPERS

1.	Plant Biotechnology	BTE312	(2,1)
2.	Animal Biotechnology	BTE311	(2,1)
3.	Enzymology	BTE305	(2,1)
4.	Fungal Biotechnology	BTE313	(2,1)
5.	Waste Management	BTE314	(2,1)
6.	Water and Waste water treatment	BTE315	(2,1)
7.	Molecular Diagnostics	BTE316	(1,2)
8.	Biosensor	BTE309	(3,0)
9.	Radiobiology	BTE317	(2,1)
10.	Biomaterial	BTE410	(2,1)
11.	Marine Biotechnology	BTE411	(2,1)
12.	Nanotechnology	BTE408	(3,0)
13.	Entrepreneurship in Biotechnology	BTE403	(3,0)
14.	Fermentation Biotechnology	BTE412	(2,1)
15.	Introduction to forest and watershed management	BTE413	(2,1)

16.	Biofuels and biorefineries	BTE414	(3,0)
17.	Virology	BTE415	(3,0)
18.	Pharmaceutical Biotechnology	BTE401	(3,0)

Eligibility Criteria for BS Biotechnology:

- The Candidate holding F.Sc or equivalent qualification with relevant subject in which he/she wants to take admission with at least 45% marks.

Medical Laboratory Technology (MLT)



Faculty of Biomedical and Life Sciences

Kohsar University, Murree

Scheme of Study for BS (Hons) Medical Laboratory Technology
Degree Program from Fall 2022 onwards

Credit Hours Distribution

<i>Course Categories</i>	<i>Cr. Hrs according To New HEC Policy</i>	<i>KUM Cumulative Cr. Hrs</i>
Majors	54	54
General Education Courses	39	39
Minors	12	20
Distribution Courses	18	23
Research	6	6
Practical Learning Lab	0	0
Internship	0	0
<i>Total Credit Hours</i>	<i>130</i>	<i>136</i>

**Proposed Distribution of Courses
(Regular Track)**

Framework For BS (Hons) MLT (4 Years Program)

- Total numbers of Credit hours 136
- Duration^[1-1]_[SEP] 4 Years
- Semester duration 16-18 Weeks^[1-1]_[SEP]
- Semesters 08
- Course Load per Semester 9-21 Cr. hours
- Number of courses per semester 5-7

Proposed Study Plan for BS (Hons) Medical Laboratory Technology Semester Wise

Course Codes have been assigned considering coding system approved by Kohsar University, Murree.

SCHEME OF STUDIES

Course Code	Courses	Cr. Hrs.	Course Code	Courses	Cr. Hrs.
Semester 1			Semester 2		
SOC-101	Sociology	3(3,0)	GEN-103	Economics	3(3,0)
KUM-111	Pakistan Studies	2(2,0)	STA-202	Biostatistics	3(3,0)
MLT-101	Human Anatomy	3(2,1)	MIC-102	Fundamentals of Chemistry	3(2,1)
MTH-106	Mathematics – I	3(3,0)	ENG-102	English-II	3(3,0)
ENG-101	English – I	3(3,0)	IST-101	Islamic Studies / Ethics (For Non-Muslim only)	2(2,0)
MLT-102	Medical laboratory orientation	(0,1)	MLT-103	Human Physiology	3(2,1)
<i>Total Credit Hours</i>		15	<i>Total Credit Hours</i>		17
Semester 3			Semester 4		
PSY-101	Introduction to Psychology	3(3,0)	MIC-204	Biosafety and Risk Management	3(3,0)
CSC-101	Introduction to Information and Communication Technology	3(3,0)	MIC-104	Fundamentals of Microbiology	3(2,1)
MLT-201	Fundamentals of Medical Laboratory Technology	3(2,1)	MLT-204	Fundamentals of Hematology	3(2,1)
MLT-202	Basic Biochemistry	3(2,1)	MLT-205	Basic Immunology	3(2,1)
MLT-203	General Pathology	3(3,0)	MLT-206	Histotechniques	3(2,1)
BTE-102	Cell Biology	3(2+1)	MLT-207	Chemical Pathology-I	3(2,1)
<i>Total Credit Hours</i>		18	<i>Total Credit Hours</i>		18

Course Code	Courses	Cr. Hrs.	Course Code	Courses	Cr. Hrs.
Semester 5			Semester 6		
MLT-301	Red Blood Cells Disorders	3(2,1)	MLT-306	WBC and Platelets Disorders	3(2,1)
MLT-302	Chemical Pathology-II	3(2,1)	MLT-307	Medical Bacteriology II	3(2,1)
MLT-303	Medical Bacteriology-I	3(2,1)	MLT-308	Clinical Parasitology	3(2,1)
MLT-304	Medical Laboratory Instrumentation	3(3,0)	MLT-309	Clinical Immunology & Serology	3(2,1)
MLT-305	Medical Virology	3(2,1)	MLT-310	Research Methodology	3(3,0)
BTE-201	Introduction to Molecular Biology	3(2,1)	BIF-102	Bioinformatics - I	3(2,1)
Total Credit Hours		18	Total Credit Hours		18
Semester 7			Semester 8		
MLT-401	Blood Banking	3(2,1)	MLT-406	Epidemiology and public health	3(3,0)
MLT-402	Medical Laboratory Management Skills	2(2,0)	MLT-407	Vaccinology	3(2,1)
MIC-403	Clinical Mycology	3(2,1)	MLT-408	Cytology and Cytogenetics	3(2,1)
MLT-404	Molecular Diagnostics	3(2,1)	MLT-409	Health Informatics	3(2,1)
MLT-405	Biomedical Ethics	2(2,0)	MLT-410	Seminar	1(1,0)
MLT-XXX	Research/ Senior Design Project I	3(0,3)	MLT-XXX	Research/ Senior Design Project II	3(0,3)
	Optional Paper I*	3(3,0/1)		Optional Paper II*	3(3,0/1)
Total Credit Hours		16	Total Credit Hours		16
* The Senior Design Project (6 credit hours) will be offered to those students who have secured a minimum CGPA of 2.5 till 6 th Semester. Other students will be offered 6 Credit Hours optional courses in 7 th and 8 th semester from the list of courses.					
KUM-201 Entrepreneurship			Internship		
There will be session of 1 hour in 2 weeks in last semester		Non-credited course	Internship of 08 weeks can be done after 4th semester (usually in summer vacations). Internship needs to be supervised and report needs to be evaluated and certified by ORIC.		Non-credited course
Total Credit Hours = 136					

Optional Papers:

List of Optional Courses BS		
Course Code	Name of Course	Credits
MLTXXX	Microbial Pathogenesis	3(2,1)
MLTXXX	Bacteriocins	3(3,0)
MLTXXX	Human Molecular Genetics	3(2,1)
MLTXXX	Cell and Tissue Culture	3(2,1)
MICXXX	Nanotechnology	3(3,0)
MLTXXX	Molecular Mechanisms of Antimicrobial Drugs	3(2,1)
MLTXXX	Probiotics	3(2,1)
MLTXXX	Forensic Science	3(2,1)
MICXXX	Zoonotic Diseases	3(2,1)
MICXXX	Genetic Engineering	3(2,1)

Degree Completion Requirement(s)

To become eligible for award of BS degree, a student must satisfy the following requirements:

- a) Minimum credit hours shall be 134 for BS (Hons) MLT program including optional courses or a capstone 1 year project.
- b) Must have earned CGPA (Cumulative Grade Point Average) of at least 2.4 on a scale of 4.0.

Duration

The program shall comprise of minimum 4 and up to a maximum of 6 years as per rules of the Kohsar University Murree.

Admission Eligibility Criteria

From Fall 2022, for BS (Hons) MLT the following eligibility admission criteria will be followed.

- The minimum requirements for admission in a bachelor's degree program in Medical Laboratory Technology is at least 45% marks in Intermediate (HSSC) examination with Biology or equivalent qualification with Biology certified by IBCC.

Assessment & Evaluation

The semester and examination rules and regulations of the Kohsar University Murree shall be followed for assessment and evaluation.

